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No. III. OF VOL. II., 1934. LONDON, SATURDAY, JULY 21, 1934 Pp. 120—Price 1s.
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No. 5786 LONDON, SATURDAY, JULY 21, 1934 CCXXVII

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ADDRESSES AND ORIGINAL ARTICLES

VIRUSES IN RELATION TO THE ÆTIOLOGY OF TUMOURS *

By C. H. Andrewes, M.D., M.R.C.P. Lond.

MEMBER OF SCIENTIFIC STAFF, NATIONAL INSTITUTE OF MEDICAL RESEARCH

In the preceding lecture I put forward reasons for supposing that viruses might be ætiologically related to tumours. These fell under two main headings: first, viruses have been shown to cause tumours in birds; secondly, the proliferative changes produced by some viruses in cells make it not difficult to imagine that they could give rise even to true new growths.

Some Objections to the Virus Hypothesis

The virus hypothesis of cancer is, however, open to a number of very obvious objections, some of which we must proceed to consider.

NON-INFECTIOUSNESS OF TUMOURS

In the first place, tumours are not infectious. There is no evidence of any value that a tumour either of man or animal is acquired as a result of contact between one individual and another. I say this notwithstanding the vast literature which has accumulated on the subject of so-called cancer houses and, as regards mice, of cancer cages. Cancer is such a common disease that apparent instances of infection are bound to crop up simply as a result of coincidences or of causes other than infection with a cancer parasite. Exceptions must be made in favour of infectious warts and the transmissible venereal lymphosarcoma of dogs, neither of which is generally admitted as a "typical" tumour. Nor am I considering the very rare instances in which actual inoculation of tumour cells may have occurred.

The fowl tumours, which are certainly due to an extracellular agent, show no more evidence of infectivity than do the mammalian tumours. Rous and other workers since have fed fowls on tumour material and have attempted in other ways to obtain evidence as to possible modes of infection, but always in vain. Furthermore, when sporadic tumours appear in a flock of birds, the successive tumours which arise may be of very different histological types. Thus four successive spontaneous tumours appearing amongst the fowls on the Medical Research Council's farm at Mill Hill were a spindle-celled sarcoma, a polymorph-celled sarcoma, an osteochondro-sarcoma, and a tumour probably derived from muscle cells.[33]

Borrel [54] first advocated a virus theory of cancer because he thought there was evidence of infectivity of tumours, but to-day this evidence is discredited and advocates of the theory must adhere to it not because of but in spite of the data concerning infectiousness.

To produce any infection one requires at the least three things—a host, a parasite, and a set of circumstances permitting the parasite to infect the host. In many instances the importance of this third factor appears more striking than the mere bringing together of host and parasite—it is so with tuberculosis, with amœbic dysentery, and with tetanus. If tetanus were due to a virus and not to a cultivable bacterium, there would be but little more evidence of its parasitic origin than is available for cancer. Again, most cases of malignant endocarditis are caused by infection of the heart valves with an ordinarily harmless saprophytic streptococcus; no connexion can be traced between one case of the disease and another. Indeed, there is no direct connexion: a third factor such as I spoke of is all-important in the pathogenesis of the condition. Clearly then, a disease of parasitic origin need not be demonstrably infectious, and this objection to the virus theory of cancer cannot be stressed unduly.

MULTIPLICITY OF VIRUSES

Tumours are of many degrees of malignancy, of many types of tissue, of many species of animal. Pathologists have naturally recoiled at the thought that each of these different tumours might be caused by a different virus. Some tumours are extremely rare and one could scarcely imagine a virus which gave evidence of its existence only once or twice in a generation. Yet it seemed equally unlikely that one parasite could cause all types of tumours and that yet in the case of propagable tumours of animals each should remain true to type on transplantation. Gye's attempt to solve this dilemma will be discussed later.

Fowl tumours resemble those of mammals in their diversity of type, and it seemed, therefore, pertinent to inquire whether there was evidence that different growths of the fowl were caused by many different viruses or by one virus. I have sought to solve this problem by serological methods.

Most viruses evoke the production of antibodies which are demonstrated by their power of neutralising the virus in question when mixed with it in vitro. Complement-fixing and other antibodies may occur also but the neutralising properties are, with viruses in general, the easiest to demonstrate. Neutralising antibodies can be shown to be formed against fowl-tumour viruses; they occur in the largest amounts in the sera of fowls which have borne certain chronic tumours for at least five months.[55] Normal fowls, particularly as they grow older, may develop in their sera varying amounts of similar neutralising properties. Usually such sera are not very active, and in only a very small percentage of birds are they as potent as the sera of birds with chronic fibrosarcomata. The antibodies in fowls with a slow-growing fibrosarcoma (MHI) were found not only to be capable of neutralising filtrates of the homologous tumour but also to be active against the viruses causing other tumours of different histological types, the Rous No. 1 spindle-celled sarcoma, three fibrosarcomata (BS1, RF4, and RF11), and an endothelioma (MH2).[56] Rous No. 1 was, however, always more readily inactivated than the others. But Fujinami's tumour, another rapidly growing sarcoma, histologically exactly like Rous No. 1, was not neutralised. The few potent sera from normal birds acted like those from the fowls with fibrosarcomata: they neutralised Rous No. 1 most readily, Fujinami's sarcoma not at all, and the other tumours mentioned to an intermediate degree. It is likely, therefore, that the antibodies in the birds with chronic tumours represent only an enhancement of a property occurring to a varying degree in normal birds. The neutralising agent has the properties of other antiviral antibodies [57] and is unlikely to be the same as the inhibitor described by Murphy [58] as occurring in slow-growing fowl tumours and elsewhere. The results so far obtained indicated that viruses

* The second Oliver-Sharpey lecture for 1934, delivered before the Royal College of Physicians of London on May 3rd. Lecture I. appeared in our last issue.

causing different types of fowl tumour were, if not identical, at least closely related antigenically.

Further light was shed by preparing sera in species other than the fowl. It was found that many fowl tumours would grow temporarily in the pheasant and then regress [59]; and these pheasants could be hyper-immunised and yielded potent neutralising sera. Such sera were found to be more specific than the fowl sera. Though cross-neutralisations occurred, antibodies from a pheasant immunised with one tumour were always much more active against filtrates of the homologous tumour than against those of another, even though the tests with fowl sera had shown that the two tumour viruses were closely related.[56] It seemed reasonable to suppose that two fowl-tumour viruses might have an antigenic group in common and might each have in addition a specific antigenic grouping of its own. Experiments on active immunity in pheasants confirmed the suggestion of an antigenic relationship between different viruses.[60] The Rous No. 1 sarcoma almost invariably produced fatal tumours in pheasants; other tumours, as just mentioned, commonly regressed. Pheasants hyper-immunised with material from such tumours were completely or relatively immune to the more malignant Rous No. 1, and such immunity was shown not to be accounted for by immunisation by fowl protein.

As already mentioned, the various fowl sera studied showed no neutralising power against Fujinami's virus. Sarcomata caused by this virus when grown in adult ducks commonly regress, and these birds can then be hyper-immunised just as can the pheasants injected with the Rous and other viruses. The anti-Fujinami sera prepared in the duck are most active against the Fujinami virus but also show some neutralising power against Rous and the other tumour viruses. It appears, therefore, that even the Fujinami virus has some antigenic relation to the others studied, although the connexion is a more distant one than between the Rous and those related to it (MH2, BS1, RF4, RF11).

The work of Gye and Purdy with antisera prepared in mammals confirms these results.[33] Antisera made by immunising goats with tumour extracts confirm the existence of a sharp antigenic distinction between the Rous and Fujinami viruses; but results obtained with the sera from immunised horses suggest that there is after all something in common between these two viruses antigenically.[11]

Studies along these lines have clearly not provided as sharp an answer as one could have hoped for. Serologically the various fowl-tumour viruses are neither identical nor entirely distinct. They seem rather to constitute a group of agents, some closely, some more distantly related. Very similar findings are met with amongst groups of allied bacteria which are shown to possess both group and specific antigens giving rise in the inoculated animal to corresponding group and specific antibodies. Of particular interest is the fact that the bacteriophages attacking the intestinal bacteria may also be classified into broad serological groups: minor antigenic differences are present here also among the individual members of each group.[61 62]

SPECIFICITY OF FOWL-TUMOUR VIRUSES

One may approach in another way the difficulty presented by the remarkable individuality of every tumour. Everyone knows what extraordinary diversity there is amongst human tumours; and the same applies to the transplantable tumours of the mouse and rat. These maintain their individual characteristics from generation to generation, and one is not unduly surprised, knowing that the cells of the animal body may vary in any number of ways and that the transplantable tumour is merely continuing to reproduce the characters of the cells which are transplanted. But when one finds fowl tumours, transmissible by a cell-free agent, showing the same extraordinary diversity from tumour to tumour and the same constancy of characters when a single tumour is propagated in series, one naturally has to stop and think. No one, I think, can be blamed for being reluctant to believe in the virus theory of cancer when he is confronted with facts such as these.

Attempts at Reconciling Apparently Conflicting Facts

Those who have, within recent years, attempted to construct theories about tumours may be divided into two categories. First, there are those who have based their theories on the known facts about mammalian tumours and have ignored the avian sarcomata or else brushed them aside as inconvenient anomalies. Secondly, we have those who have faced the fact that tumours do occur in birds as well as in mammals, and have tried to frame a theory which shall be applicable to the tumours of both these orders of the animal kingdom. We need only consider those who fall into the second category, and see how they have attempted to explain the existence side by side in the world of filtrable fowl tumours and non-filtrable mammalian cancers, and how they have sought to account for the presence of a virus-like agent in fowl tumours which otherwise behave in a way so very unlike an infective disease.

1. *Filtrability of fowl-tumour cells.*—Many of our difficulties would be resolved if it could be supposed that very minute forms of the fowl-tumour cells occurred and that these could pass through filters or survive in desiccated tumour tissue and initiate new tumours when inoculated into a fresh host. The difference between mammalian and avian sarcomata might thus find an explanation. Unfortunately for this view, it has been impossible to demonstrate these supposed minute cells in filtrates: indeed it seems certain that the active agent is below the limits of resolution of an ordinary microscope. It is thus not only smaller than the smallest known cell of a higher animal, but very much smaller, smaller even than a bacterium. The filtrable cell theory, which was frequently put forward after Rous's discovery of a filtrable fowl tumour, has consequently been abandoned even by those who at one time advocated it.[63]

2. *Possibility of growth of a tumour cell from a small fragment.*—Since it has become clear that tumour cells could not themselves be filtrable, it has been suggested that a cell nucleus or a minute fragment of a cell nucleus might have the power of passing a filter and duly growing again into a complete cell.[64] Since comparatively small injuries to the nucleus will kill a cell, such a theory cannot appear very attractive to a biologist. The point might, however, be argued were it not for the existence of such tumours as Fujinami's sarcoma.[59] A filtrate of this fowl tumour can infect both fowls and ducks, and immunological tests show that the resulting tumour is formed in the one case of fowl, in the other of duck cells. No one can seriously maintain that a minute fragment of a fowl cell nucleus can ever grow up into a duck cell. Further discussion of this theory is therefore needless.

3. *The gene theory.*—"Gene" is the term used by geneticists to indicate the unit in the chromosome which carries a hereditarily transmissible character. It has been suggested by Lockhart-Mummery [64] and

others that a gene might become wild, loose from the chromosome which is its natural environment, and imprint its character on fresh cells with which it came into contact: such a theory has been put forward to explain the nature of viruses in general, including bacteriophages as well as those of tumour agents. It is urged that the size allotted by the geneticists to the gene is of the same order as that of viruses, and that the existence of a gene is not confined within the limits of a single species, as is proved by the occurrence of hybrids. It is difficult to argue positively about the possible behaviour of a biological agent which has never yet been shown to exist in a free state. Nor can one readily deny that a tumour agent *may* have similar physical properties to a gene, when the latter are purely a matter for conjecture. There has, however, been no suggestion, as far as I am aware, that a gene can act as an antigen, as a tumour virus can, in the animal in which it exists. In our present state of knowledge it seems wiser on the whole to confine our speculations to less fantastic channels.

4. *Theories which postulate that the tumour agent is a cell-product.*—We are left with two possibilities: the agent may be a small living micro-organism or a cell product which can stimulate another cell to unlimited proliferation and at the same time to the elaboration of more of the same cell product. The latter view has a number of advocates, of whom Boycott [65] and Murphy [66] have put forward the clearest arguments. The view is much worthier of consideration than the three we have already been able to dismiss. It seems most profitable to consider side by side the views that the tumour agent is a virus and that it is a cell product. It will be evident that a number of facts tell strongly in favour of its virus nature. Let us first see, then, what Boycott, Murphy and their followers are "up against" when they try to account for the agent as a cell product.

EVIDENCE FOR THE VIEW THAT THE FOWL-TUMOUR AGENT IS A VIRUS

There is no time now to discuss the question of whether viruses in general are small organisms; I am, for purposes of this discussion, considering a virus as a living micro-organism.

(*a*) The tumour agent is capable of unlimited multiplication, but, like other viruses and some higher organisms, only in the presence of living cells either in the intact animal or in tissue cultures.

(*b*) It causes the production in the infected bird of antibodies which, as already discussed, show group and specific affinities like those which characterise related groups of bacteria.[56] These antibodies behave in most ways like antibodies to other viruses.[57]

(*c*) Viruses vary in their resistance to chemical and physical agencies. The fowl-tumour agent resists heat, acidity, desiccation, and a variety of disinfectants much as viruses in general do. Gye and Purdy have pointed out the close resemblance of the Rous virus and the organism of bovine pleuro-pneumonia in their inactivation by acriflavine.[33]

(*d*) Many fowl-tumour agents can infect birds other than the fowl. Filtrates of Rous No. 1 sarcoma and several other tumours, including the MH2 endothelioma, will produce tumours in pheasants [59]; and Fujinami's fowl myxosarcoma will infect ducks, a species widely remote from fowls. It is worth recalling in this connexion the hare sarcoma of von Dungern and Coca [67] which was transmissible to rabbits.

(*e*) The fowl-tumour agents show evidence of adaptability. For a time after its discovery the Rous No. 1 sarcoma was transplantable only in blood relations of the Plymouth Rock fowl in which it had spontaneously occurred. Later, growth was found to be possible in other Plymouth Rocks and, still later, in any breed of fowl.[1] Now, after many years, it has been found to be transplantable to the pheasant also.[59] Except for this last stage, transmission to an alien species, this is the sort of behaviour one is accustomed to find amongst mammalian tumours which are transplantable only by means of cells. One is not surprised that living cells can gradually be accustomed to a more and more foreign environment; the occurrence of similar behaviour in a tumour transmissible by cell-free extracts seems to imply that the tumour agent also becomes in course of time adapted in the same way. It may also be mentioned that Fujinami [50] succeeded in growing his fowl myxosarcoma in ducks only after years of effort.

(*f*) The size of the tumour agent is evidence in favour of its living nature. My colleague, Dr. W. J. Elford, has prepared a series of graded collodion membranes, the pores of which can be measured with some accuracy and for a given membrane are extremely uniform.[68] With their aid he, with various collaborators, has estimated the sizes of a number of viruses: their diameters apparently range from about 150 mμ—or more than a tenth of 1 μ—in the case of vaccinia [69] down to about 10 mμ—or one-hundredth of 1 μ—for the virus of foot-and-mouth disease.[70] Filtration experiments with the Rous virus have proved difficult because of the sticky material which is associated with the virus in filtrates, but we have now succeeded by a new method in obtaining virus of high titre free from almost all detectable protein. Attempts to estimate the size of the virus in this purified material are still incomplete, but we can already say with some confidence that the virus is of the order of size of the larger rather than the smaller viruses previously measured.

BOYCOTT'S VIEWPOINT

Boycott and Murphy are alike in suggesting that the Rous agent is not a virus, but they reach a common position by arguing along rather different lines. Boycott [65] in 1928 suggested that there was perhaps no sharp line of demarcation between the living and the dead in nature. Each of the facts adduced in support of the living nature of viruses in general—and of the Rous virus in particular—could be paralleled in the world of admittedly inanimate objects. Thus other things than living organisms appear to multiply. For instance, one might expect a cell-stimulating autolytic product acting upon a tissue culture to lead potentially to the production of more of the same agent. Bordet [71] also has pointed out that the reproduction of thrombin in the clotting of blood bears analogies to the multiplication of an organism. Boycott also refuses to be deterred by the fact that the Rous agent can induce the formation of antibodies in an infected bird. He points out that although such an occurrence is usually evidence of the extrinsic origin of an agent, it need not necessarily be so. For the lens protein of an animal can act as an antigen when injected into the same animal species. Again, almost any antiseptic or physical agent which inactivates a virus such as that of fowl tumours can be shown to have also a destructive action on some unorganised substance.

I know of no one criterion by which one can define a living thing: one must in our present state of knowledge judge whether a thing is alive or dead by applying to it a number of criteria. Boycott's ingenuity has revealed a number of analogies to the Rous and other viruses in the inanimate world; but

he has had to concentrate on one criterion at a time. I know of nothing but a living organism which can multiply *and at the same time* act as an antigen in the animal which it infests or injures *and at the same time* shows the same range of susceptibility to a whole series of physical and chemical agents as known micro-organisms *and at the same time* shows evidence of adaptability *and at the same time* has a size compatible with organisation of some complexity. As Rous and Murphy [72] wrote in 1912 of the tumour agent, "No single attribute among those determined suffices to show the nature of the agent; yet taken together its characters are those which we associate with micro-organisms."

I should hate to dispute Boycott's theoretical point that the line of demarcation between the live and the dead may be an artificial one; but for practical purposes I maintain that there is a very sharp difference between viruses (including the Rous virus and bacteriophages) on the one hand and the other, apparently transmissible, substances with which they have been compared.

MURPHY AND TRANSMISSIBLE MUTAGENS

Murphy [66] has, very naturally, been impressed with the difficulties of believing that spontaneous tumours can be due to a living organism, difficulties we have already discussed. But unlike Boycott, who doubts whether viruses in general are alive, Murphy seeks to separate off from the other viruses certain agents to which he would apply the name "transmissible mutagens." This category would include, I gather, the fowl-tumour agents, such an agent as that causing change of type amongst pneumococci and possibly also plant mosaic viruses and bacteriophages. The characteristics of a transmissible mutagen are, first, ability to direct the specific differentiation of the cell into an abnormal channel and secondly, of course, transmissibility. It seems a far cry from cancer to types of pneumococci, but we must diverge for a moment to see why Murphy brings the pneumococci into the story. The successive discoveries of Griffith,[73] Dawson,[74] and Alloway [75] have revealed that a product of one type of pneumococcus—let us say of type I.—can change, for instance, a type III. organism into a type I. in vitro, usually through the intermediate stage of an avirulent, rough organism. From the type I. so obtained one can extract more of the same product, which is capable of converting more type III. pneumococci into type I., and so on. The product thus appears to multiply when in contact with living pneumococci, and, according to Murphy, its action in changing the pneumococcus type is strictly comparable with that of the agent which causes fowl cells to become malignant. From our earlier discussion of Boycott's views, it will, however, be obvious that the pneumococcus type-switching agent only has in common with the Rous virus one property of a living thing—power of multiplication. So far as has been shown, it possesses none of the other properties on which I have laid stress; and the analogy with the Rous virus does not therefore appear to me particularly striking.

In a series of papers Murphy [66] and his co-workers have emphasised differences between the Rous virus and viruses in general. They maintain that the Rous agent can be purified by chemical manipulations which would be fatal to a living thing; that antigenically it does not behave like an organism, and that it differs also in other respects, such as in its high resistance to inactivation by ultra-violet light. By precipitation and solution in ways which I have no time to discuss in detail, they obtained a tumour agent of considerable potency yet free from demonstrable protein. Murphy says "it is hardly conceivable that the active fraction I have thus succeeded in obtaining, a substance purified by repeated precipitations, could carry with it through all these manipulations a living organism or virus." [76] Elsewhere he talks of the purification of the agent "by being repeatedly dissolved in alkali and reprecipitated with acid." [77] Almost every month I see these claims quoted in discussions on cancer and elsewhere in support of the view that the Rous agent *cannot* be a virus. But this "treatment with alkali and acid" which sounds so drastic, actually involves adjustments of pH only within a range of 4·7 to 8—nothing, in fact, which would damage the majority of viruses very seriously. Further, vaccinia virus can be purified by adsorption and elution; or can be carried down on a precipitate by acidifying and then be freed when this is redissolved.[78] In fact, these experiments afford no basis whatever for distinguishing the Rous virus from other viruses. Murphy has also attempted to show that the antigenic behaviour of fowl-tumour agents is out of the ordinary.[79] I have already alluded to the development of neutralising antibodies in tumour-bearing fowls. Further, to one who is familiar with serological work with viruses, Murphy's own experiments on the immunisation of rabbits with purified tumour extracts only serve to emphasise the close correspondence between his work and the findings of workers with other viruses.

Three other differences between tumour-agents and viruses emphasised by Murphy concern what appear to me to be minor points altogether.

(*a*) Sturm, Gates, and he[80] selected for study one physical agent, ultra-violet light, and found, as Baker and Peacock [81] did also, that the tumour agent was more resistant to inactivation by it than were the organisms which they selected to compare with it. It has lately been reported,[82] however, that the resistance of tobacco mosaic virus to ultra-violet light is even greater than that of the Rous virus.

(*b*) Reynals and Murphy [83] reported that the Rous agent was fixed and inactivated by susceptible tissues, but not by those of insusceptible species. In this respect it recalls the fixation of bacteriophages by bacteria. Gye,[11] however, has failed to confirm Reynals and Murphy's finding.

(*c*) The action of the tumour agent is inhibited by certain extracts of slow-growing tumours (inhibitors) which appear to be distinct from true antibodies.[84] Similar substances are reported by Murphy to occur in normal tissues.[84] Some work of Shope's [85] suggests the possibility of a similar sort of action against the virus of filtrable rabbit warts described by him.

To sum up, the two major differences alleged by Murphy between the Rous virus and other viruses have no existence in fact. The minor ones appear to me to be no greater than those which could be found between any two viruses having rather different parasitic habits.

Fränkel,[86] on the basis of attempts to purify the Rous virus by adsorption and elution, has similarly sought to place the virus in a category of "virus-enzymes" apart from most other viruses. The derogatory remarks I have made about transmissible mutagens may be taken as applying to virus-enzymes also.

Carrel [13] has suggested that the Rous virus is not a true virus but rather comparable with the bacteriophage. I shall not quarrel with him on this score inasmuch as I consider that the evidence that the bacteriophages constitute a group of living organisms is becoming harder and harder to resist.

I have often been tempted to believe, with Boycott

and Murphy, that the Rous agent is a cell product and not a living parasite; but its analogies with other viruses are so striking that I cannot conscientiously disregard them. It is easy to understand the point of view which refuses to believe that the filtrable agent in a spontaneous tumour—or a tar-induced tumour—is a virus. But if the agent has all the properties of a virus, one can go too far in denying that it is a virus simply because it turns up in an unexpected place. If one found something with all the properties of an elephant on top of the Matterhorn, rather than deny it was an elephant one would seek to explain how it got there.

GYE'S TWO-FACTOR HYPOTHESIS

Very different is Gye's attempt to solve the problem; and whatever be the merits of his hypothesis it cannot be denied that his paper,[32] published in 1925, stimulated a world-wide interest in the filtrable fowl tumours which for some years had been undeservedly neglected. Gye suggested that there was one cancer parasite—or at most a small number of them; he could not believe in a different virus for every tumour. To explain the specificity—and the transmissible specificity—of the fowl-tumour viruses, he suggested that the virus by itself could not infect a cell; to do so it must be associated with a second, chemical, factor; this second factor determined the type of tumour which would be produced by the virus. The nature and origin of the second factor was very obscure; but Gye's later work shows that he believes it to be a product of the fowl cells. Put rather crudely, his idea is that a virus linked on to some product of a fibroblast produces a spindle-celled sarcoma, linked to some constituent of an endothelial cell it gives rise to an endothelioma, and so on.

In the work he reported in 1925 he had attempted to separate the two factors in a fowl-tumour filtrate, to show that each by itself was ineffective but that when they were recombined they could produce a tumour. The virus was apparently destroyed by chloroform or acriflavine and the specific factor left; on the other hand, when filtrates were incubated anaerobically in a special culture medium the virus was believed to survive while the secondary factor disappeared. Other workers failed to confirm these experiments of Gye's, and after many years' efforts directed to the perfecting of a fool-proof technique, he himself realised that the difficulty of controlling a number of variable factors made it impossible to obtain reproducible results by his original methods. Nevertheless, he did not abandon his hypothesis but was inclined to believe that the association between virus and second factor was more intimate than he had thought at first, perhaps too intimate for breaking-up and reunion to be accomplished at all readily.

Fresh light has been thrown by his later work with Purdy along serological lines.[33] The prolonged immunisation of goats with Rous extracts yielded neutralising antisera against the Rous virus of considerable potency. But, unexpectedly, neutralising sera could also be obtained when goats were immunised with extracts of normal chicken embryo. The sera obtained in these two ways were not, however, identical. There was evidence that the anti-tumour sera contained two antibodies, one active against the virus, the other an anti-fowl element. The goats immunised with embryo-extract contained in their sera only the second, the anti-fowl antibody. Either antibody could neutralise the Rous virus, but while the antiviral one—like other antiviral sera—acted in the absence of complement, the second one would only neutralise in the presence of complement. The anti-fowl antibody could be absorbed out of a serum by repeated absorptions with chicken embryo: the specific antibody to the virus could not. (See Figure.)

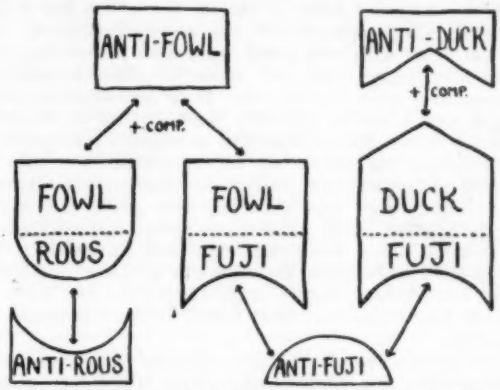

Diagram showing neutralisation of Rous virus, fowl-grown Fuginami virus, and duck-grown Fuginami virus by various goat antisera.

These results, in the opinion of Gye and Purdy, constituted fresh evidence in favour of the two-factor hypothesis. Apparently the active agent could be neutralised by an antibody reacting with either of its constituent parts—the virus element or the fowl element—though for unknown reasons complement was necessary to enable one of the antibodies to act. Additional support for this view was obtained when sera were prepared also against Fujinami's fowl sarcoma; this, as already mentioned, infects both ducks and fowls. When extracts of fowl-grown Fujinami tumours were used to immunise goats the sera obtained were active against the Fujinami virus, as might be expected; anti-fowl sera also inactivated the virus, as it did the Rous, in the presence of complement, but there was no specific cross-immunity between the Rous and Fujinami viruses. Any cross-neutralisation shown by the anti-tumour sera could all be accounted for by the anti-fowl element in those sera. This antigenic difference between the Rous and Fujinami viruses has already been revealed by the experiments with fowl, pheasant, and duck sera.[56]

But if now Fujinami's tumour was grown in a duck and extracts of that tumour were used for similar experiments, behold, the virus was still neutralised by specific anti-Fujinami sera but no longer by the anti-fowl sera! On the contrary, it was now inactivated by anti-duck sera as the fowl-grown tumour had not been.[56] A Fujinami filtrate is thus neutralised by anti-Fujinami-virus antibody wherever the tumour has been grown, and by anti-fowl or anti-duck serum as well according to the bird in which it has developed. This clearly supports Gye's notion that the active agent is of dual nature and that its activity is destroyed if a serological reaction with either moiety takes place.

The neutralisation by anti-fowl serum cannot be explained on the basis that the virus is mechanically carried down on a precipitate and so put out of action, for either neutralisation or precipitin formation may occur in the absence of the other.

Recently Gye has shown[56] that an antibody to fowl serum-proteins has no neutralising power against a tumour virus; extracts containing cell nuclei must be used to obtain a potent antiserum. He feels, therefore, that his second factor is perhaps closely related to the proteins of the cell nucleus itself.

Gye's hypothesis may be right: its claims to be seriously regarded rest, in my opinion, on theoretical considerations and on his later, serological, work rather than on his earlier attempts to separate and recombine two factors. I do not feel, however, that the serological results in themselves prove the truth of his main contention. The neutralisation of the Rous virus with anti-fowl serum does indeed suggest most strongly that the virus is more intimately associated with fowl-protein than are other viruses with the proteins of their hosts. But it remains purely a speculation that this associated fowl-protein determines the specificity of the virus. For all we know to the contrary, the Rous virus may be linked to exactly the same fowl protein as is the MH2 endothelioma virus. One can explain the serological results in other ways than Gye and Purdy do. To give but one example, the action of anti-fowl antibody and complement might be to strip from the virus a protecting protein without which it was too labile to survive.

On purely theoretical grounds also I find the two-factor idea not wholly satisfying. There are many different connective-tissue tumours of the fowl, varying in their rate of growth, in the localisation of their metastases and in other ways. It is true that the Rous sarcoma itself varies from time to time in its rate of growth; these variations possibly correspond to differing amounts of Murphy's inhibiting factor in it. But this and other fowl sarcomata all vary around their own means; one does not turn into another. In most of them cells of the fibroblast-fibrocyte series are presumably "cancerised"; can one believe in distinct specific factors corresponding to a number of slightly different fibroblast-like cells and, if not, has the second factor any value as an explanation of specific differences amongst such tumours? Is it not simpler to believe in a virus or group of viruses which under certain conditions is capable of remarkable specialisation or adaptation?

THE INDIGENOUS CANCER-VIRUS

The last hypothesis which I wish to discuss is not a new one; it is certainly not of my own invention; it may be regarded as being in its main outline the highest common factor of the views of all who have seriously considered the virus theory of cancer, including Rous and Gye. It supposes that when tar or X rays or other agents initiate malignant changes in the cells of a mammal or bird, no virus is introduced from outside; virus is there already. The tar or other agent merely enables the virus to infect or cause pathological behaviour of the cell. As Borrel [54] said in 1910, "l'Organisme normal, non preparé par une cause adjuvante, n'a pas de cellules receptrices pour le virus cancéreux." The properties which must be postulated for a cancer-virus have been discussed recently by Rous.[87] I should like to quote a few of his remarks:—

> "Clearly the supposititious infectious agent can be no ordinary one; . . . a living entity responsible for such growths (tumours) must require for effectiveness a very special basis of predisposition. . . . The agent must be present frequently in the animal body and well-nigh ubiquitous in nature, else tarred mice in all parts of the world could not regularly become cancerous. On the other hand, it can only occasionally reach cells susceptible to its action, or the cells must rarely become susceptible. . . . One may assume that the hypothetical cancer-producing agent leads an existence in or upon the host, and is harmless save on special occasion—like the staphylococci or the colon bacillus—or that it passes in and out of the body frequently without causing harm save when highly unusual conditions provide it with a foothold—as happens with actinomyces.'

In experiments reported in a paper, from the introduction to which I have just quoted, Rous and Botsford [87] show that sheltered mice—mice reared from an early age on as far as possible sterile food, in sterilised cages and on sterile bedding—develop cancer just as readily when tarred as do mice reared under conditions rather dirtier than usual. They deduce that if a virus is responsible for tar tumours it cannot have reached the mice from outside during the period of tarring, during which the tumours developed.

If critics of the virus hypothesis realised that its upholders considered the ubiquity of the virus as a necessary feature they would not speak of "materials (fowl-tissues) which certainly do not contain a virus" as Murphy [76] does or of "fowls acknowledged to be virus-free" as Haddow does.[88] One cannot certify a fowl free of an invisible virus any more than one can by naked-eye examination certify a milk free from tubercle bacilli. In favour of the presence of a virus in normal fowls is the occurrence of neutralising antibodies against Rous No. 1 virus in normal fowl sera. As already mentioned, in a small percentage of fowls these antibodies are quite potent, but the majority of normal fowl sera will be found to have a little neutralising power—such as is not present in normal human, rabbit, duck, or pheasant sera. This finding is recorded by Pentimalli,[89] by Andrewes,[55] and by Sittenfield.[90] The reported recovery of a tumour agent by Murphy [76] from normal fowl testis may also be of significance.

As to how the predisposing causes could permit a virus to produce its effects different workers have speculated rather differently. Some would believe that only under abnormal conditions could the virus penetrate and infect the cell. Others would rather conceive that the cells were already inhabited by symbiotic viruses and that under the influence of a carcinogenic agent the balance between virus and some controlling mechanism became upset. The last conception has the merit that a greater or lesser tilting of the balance in favour of the virus could be invoked to explain gradations from a wholly benign to a highly malignant tumour. Rous,[87] as quoted above, seems to favour an existence of the virus on the surface of the host or within its alimentary canal; Borrel [54] has emphasised the possible rôle of parasitic worms or acari as vectors of a virus; Cramer [91] has suggested a non-pathogenic intracytoplasmic virus, perhaps entering the nucleus under abnormal conditions. Further knowledge is needed before such speculation can be fruitful, but I should just like to propound one question: where could the supposed cancer virus normally multiply? It seems inconceivable that it multiplies only in tumour cells; one can hardly believe that material from human tumours could ever become widely disseminated; Rous and Botsford's experiments with sheltered mice also tell strongly against this possibility. If not in tumour cells, it may normally multiply within normal cells or outside cells altogether. One cannot press the analogy too far, but it is perhaps pertinent that the known viruses seem all to have a strictly intracellular habitat.

In suggesting that a symbiotic virus might occur in normal cells I am fully aware that supposed symbionts of mammalian cells have been described by many workers in the past. Their claims, particularly when they sought to identify mitochondria with bacteria, have not withstood critical examination. None of them, of course, used optical methods which could have revealed objects of the size which we now know that viruses possess.

The idea that tar and similar agents may act in

such a roundabout way as I have suggested may not appeal to those who would prefer a simpler solution of the cancer problem. There are, however, analogies for this sort of finding. Mere raising of the body temperature will produce on the face an eruption of herpes simplex—another virus disease—in 50 per cent. of human beings.[92] Tarring itself will render sensitive to certain strains of herpes virus the skins of guinea-pigs which are normally refractory.[93]

At the conclusion of a recent discussion on carcinogenesis at the Royal Society, Prof. Boycott [94] criticised the conception of a virus which was present in normal cells and ordinarily non-pathogenic. "One had better," he said, "call it something other than a virus." But why not call it a virus if, in fowls, it has the same properties as other viruses? Many symbiotic intracellular organisms are known throughout the animal and vegetable kingdoms. It would be strange if viruses never acted as symbionts. The symbiotic bacteria and fungi of insects afford a particularly useful field for study in this connexion; they are transmitted in some instances through the egg, and many insects cannot be obtained free from them. These symbionts can be seen going through the same life-cycles as their close relations which grow on culture media outside the body.[95]

One point about this indigenous virus hypothesis will not have escaped the watchful critic. Starting from our knowledge of the existence of avian neoplasms caused by viruses, we have come to consider the possibility that tumours of mammals may also be of parasitic origin. We have been forced to conclude that if a cancerous virus is at work here it must be able to act, not on normal, but only on predisposed cells. Yet where fowl tumours are propagable by cell-free agents, there must be a virus capable of acting on normal cells also. Clearly one will have to suppose that fowl-tumour viruses, unlike those of mammals, can become enhanced in virulence as they multiply rapidly in a tumour, so that they can eventually attack cells of normal as well as of abnormal sensitivity. As an alternative to the acceptance of Gye's two-factor theory one can imagine that, whatever were their properties in their old symbiotic days, they are now only able to multiply unrestrainedly in the type of cell in which they have recently become accustomed to doing so. Comparison of the neurotropic and viscerotropic strains of yellow fever virus in rhesus monkeys shows an example of adaptation of a virus to life in different cells of the same host.[96]

Conclusion

The following are the points I have tried to emphasise in these two lectures:—

(1) The filtrable fowl tumours are true tumours, only differing from those of mammals in that a causative agent or agents can be demonstrated apart from the cells.

(2) The properties of this agent correspond so closely with those of known viruses that we are not justified in excluding it from the virus group. Our only grounds for doing so would be its occurrence in spontaneous tumours in circumstances where we should not expect to find a virus: such grounds do not seem to me to be reasonable.

(3) Knowledge of the natural history of other viruses makes it easy to understand how the phenomena of tumour-growth might be produced by a virus: the mechanism of the inception of a spontaneous growth remains, however, a difficulty.

(4) The theoretical objections to the parasitic theory of cancer are no longer tenable in view of the facts of the filtrable fowl tumours.

(5) Discussion of the conception of an indigenous virus has suggested lines along which the parasitic hypothesis might be reconciled with the facts which appear at first to render it so improbable.

The facts and arguments which have been brought together in these lectures afford only indirect and circumstantial evidence in favour of the view that tumours in mammals may be of virus origin. Much more direct evidence is required before we can be prepared definitely to uphold such a theory. But I do venture to make the modest suggestion that on the available facts the parasitic hypothesis merits careful serious attention and not, as in the past, summary dismissal.

"No explanation of cancer," says Rous,[97] "is worthy of attention that cannot be tested." The important recent advances in our knowledge of viruses suggest numerous methods of attack on the cancer problem from the angle suggested by the virus hypothesis. It may be possible before long to obtain reasonably pure suspensions of the Rous virus particles, to agglutinate these with antiserum, to measure their size by filtration or with the aid of the centrifuge, and even to photograph them. Such things can be done with some other viruses which are probably of the same order of size. If fowl-tumour viruses could be investigated in a similar way one could later proceed to study the mammalian tumours along entirely novel lines. In emphasising the importance of attacking the tumour problem in such a way I do not wish to belittle the valuable contributions of the clinician, the statistician, the histopathologist, the organic chemist, and the biochemist. The attack by the virus worker must be considered, not as in opposition to theirs, but as part of one campaign.

In the past the parasitic theory of cancer has been light-heartedly dismissed by many students of tumours who have no personal experience of work with viruses. I dare to hope, therefore, that there may be some value in a contribution to the subject from a virus worker, even though the limitations of his knowledge of many aspects of the tumour problem are all too plain.

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THE VALUE OF AEROCYSTOGRAPHY

By Norman Ross, M.B. Leeds

LATE SENIOR HOUSE SURGEON, NORTH STAFFORDSHIRE ROYAL INFIRMARY

(WITH ILLUSTRATIONS ON PLATE)

FOREWORD

By T. H. Richmond, O.B.E., F.R.C.S. Edin., T.D.

HON. SURGEON TO THE INFIRMARY

The following article by Dr. Norman Ross has been written after two years' routine investigation of every case admitted to my wards at the North Staffordshire Royal Infirmary giving a history of possible vesical trouble. The technique he has elaborated is simple, and the time spent has been fully justified by the results. With aerocystography the enlarged lobes of a benign hypertrophy of the prostate give a smooth outline as compared with the irregular outline of a malignant prostate; calculi are easily located; vesical tumours and diverticula are defined; the capacity of the bladder can be demonstrated, and the thickness of the bladder wall appreciated. Much of the success of this work is due to the excellent X ray photographs taken by Dr. John Bromley, the honorary radiologist.

INTRODUCTION

In January of last year I published a paper on the radiographic diagnosis of prostatic enlargement—i.e., radiography of the bladder after it has been injected with air. Since that time I have had ample opportunity of furnishing further proof of the utility of an aerocystogram in the diagnosis of bladder and prostatic diseases.

In my last paper I was mainly concerned with intravesical enlargement of the prostate, and showed the unreliability of rectal examination in establishing a diagnosis. Thus in many cases where there is little or no palpable enlargement of the prostate as felt per rectum, cystostomy might reveal marked sub-trigonal projection; while in other cases marked enlargement per rectum is not necessarily indicative of intravesical involvement. Further, I pointed out that the symptoms of prostatism may be due, not to enlargement of the prostate, but to a "median bar" formation ("contracture of the neck of the bladder" or "prostatisme sans prostate") which demands an entirely different form of treatment from prostatic enlargement.

The value of cystoscopy as a confirmatory means of diagnosis was then discussed and various disadvantages described: (1) owing to contracture of the neck of the bladder it may be impossible to pass the cystoscope; (2) hæmorrhage from the passage of the instrument may cloud the field and prevent distinct vision; (3) gross sepsis may also cloud the field; (4) severe pain may necessitate an anæsthetic (general or spinal); and (5) an expert cystoscopist may not always be at hand. Aerocystography was then offered as an alternative method of diagnosis where the above contra-indications to cystoscopy are present. En passant, I mentioned its value in other types of cases apart from enlargement of the prostate, and it is with these that I wish to deal in the present paper. It must be clearly understood that, except in so far as the above contra-indications to cystoscopy are concerned, I do not advocate the aerocystogram in preference to the cystoscope, which can never be replaced. I merely regard it as a valuable alternative, and one of great importance in the chain of procedures normally carried out in the investigation of the pathological bladder or prostate.

The technique of aerocystography was fully detailed in my first paper. Reduced to simplest terms it consists of (*a*) complete emptying of the bladder, (*b*) injection of air into the bladder through a very small rubber catheter by numerous repeated fillings with a 20 or 50 c.cm. syringe, and (*c*) Potter-Bucky radiography. A low kilovoltage tube is used (40 to 50 K.V. should be quite sufficient), the obliquity of the tube being 15° to 25°. Occasionally a posterior film is taken with the central ray directed obliquely upwards and forwards so as to project the sacrum and coccyx above the field. The objective is merely the production of a sharp contrast between air and solid tissue. Even muscular fasciculation can be brought out to a nicety and, in fact, any structure which interrupts the regular outline of the interior of the bladder can be rendered clearly visible.

I propose here to confine myself to three other conditions, apart from prostatic enlargement, in which we have found aerocystography of great aid in making a pre-operative diagnosis—viz., distinction between simple and malignant prostatic enlargement, the diagnosis of vesical neoplasms, and "prostatic bar obstruction."

DISTINCTION BETWEEN SIMPLE AND MALIGNANT PROSTATIC ENLARGEMENTS

In the aerocystogram a normal bladder shows an outline which is perfectly clear and circular (Fig. I.) with an uninterrupted margin and smooth walls; its capacity, as measured by the number of fillings required, should be about 300 c.cm. When a film is taken at the correct angle, which is the same as for ordinary radiography of the bladder (15°–25°), the lower margin should be seen about ¼ in. above the margin of the pubic bones (in a full-sized plate), quite distinct, running laterally within the ileopectineal lines to the iliac bones. The extent to which it rises above the promontoric line depends, of course, on its distensibility. A large bladder is usually ovoid in shape, owing to lateral compression in the pelvis, and may be displaced somewhat to the right by a loaded pelvic colon. As gas in the sigmoid often obscures the interior of the bladder there should be a good preliminary clear-out of the bowel before the radiogram is taken. With benign intravesical enlargement of the prostate (middle and also perhaps lateral lobes) there is an obvious projection at the base of the bladder (Fig. II. on Plate). The shadow is definitely conical in shape and quite unmistakable, and its edges are continuous with those of the inferior vesical margin. The shadow is almost as dense as the catheter inside the bladder. In the female a some-

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what similar shadow may be shown by a cervical fibroid compressing the vesical neck. Calculi are frequently seen in the prostatic substance (Fig. VI.), their situation being thus definitely established, and are thrown into greater relief than in a normal radiogram of the pelvis. The capacity of the bladder depends on the duration of the obstruction. With a short history the organ is usually within the pelvis, but with a long history its capacity may have increased to 600–900 c.cm., so that it rises as high as the fourth or fifth lumbar spine.

With a spheroidal-celled carcinoma of the prostate, again, an unmistakable shadow is cast at the base of the bladder, but instead of the outline being regular it is nodular and perhaps more confined to the one lateral lobe than the other and projects beyond its normal boundaries (Fig. III.). The discovery of a malignant prostate may come as a great surprise where there is nothing either in the patient's history or in the rectal examination to suggest it, but the aerocystographic picture can be relied upon and, when capably interpreted, is almost as trustworthy as the histological examination. It is usually stated that about 2 per cent. of clinically simple prostates are malignant, but this refers only to those which, when examined per rectum, have none of the characteristics of malignancy. In many, at least, of these cases an aerocystogram will reveal the true condition. Neither tuberculosis nor gumma of the prostate will produce a picture anything like it. A multiple calculous prostate may give rise to some difficulty, but usually the calculi can be seen individually within the prostatic shadow, like small seeds. Prostatic cysts have been described, and although they are very rare they may conceivably mislead in interpretation, but I have not had any experience of these; indeed very few have been described.

Lower, in 1915, described a case of difficult urination for eight years. A small cyst about the size of the thumbnail was found protruding from the prostatic urethra into the bladder, and was successfully removed. Ekehorn described a similar case. The man was in hospital twice with acute retention. On each occasion the cyst had been burst by the passage of a catheter and caused no further symptoms until it had grown again. The pathology of these cysts is very obscure, but possibly it is associated with chronic prostatitis, or they may be congenital. Young noted and described nine cases from the literature.

In Fig. III. the essential features of a malignant prostate in an aerocystogram are readily observed: (1) the nodularity of the shadow; (2) the enlargement greater on the right side than the left; and (3) infiltration of the growth beyond the normal boundaries of the prostatic shadow. It is interesting to note how well the phlebolith (to the left of the prostatic shadow in the radiogram) is thrown up by contrast with the air. The bladder wall in this case is thin and smooth, there being no crenation or hypertrophy; it is very distensible, and the capacity is about 600 c.cm., showing a long history of obstruction.

The following is the case-history relating to Fig. III.:—

CASE 1.—The patient, aged 74, was perfectly well until two months before admission to the North Staffordshire Royal Infirmary, when he had a sudden attack of painless hæmaturia. This attack lasted about two days, and passed off just as suddenly as the onset. Since then he had had twelve attacks of hæmaturia, each attack being painless and quite paroxysmal. There had been slight aching in the back, but no pain in the legs and no cachexia. He gave a history of nocturnal frequency of micturition, but only since the onset of the hæmaturia and never before. There was no history of retention or retention with overflow. His general condition was good and there was no anæmia; but the tongue was dry and coated white. The abdomen showed nothing abnormal, and there was no distension of the bladder and no palpable enlargement of the kidneys. The spine and pelvic bones were clear. Per rectum there was no abnormality: the prostate could not be felt enlarged; there was no induration, no nodularity, and no fixation of the rectal mucous membrane. The residual urine measured 6 oz. The urine examination was as follows: specific gravity, 1012; reaction, acid; albumin, + +; polymorphs, + +; red blood-cells, +;

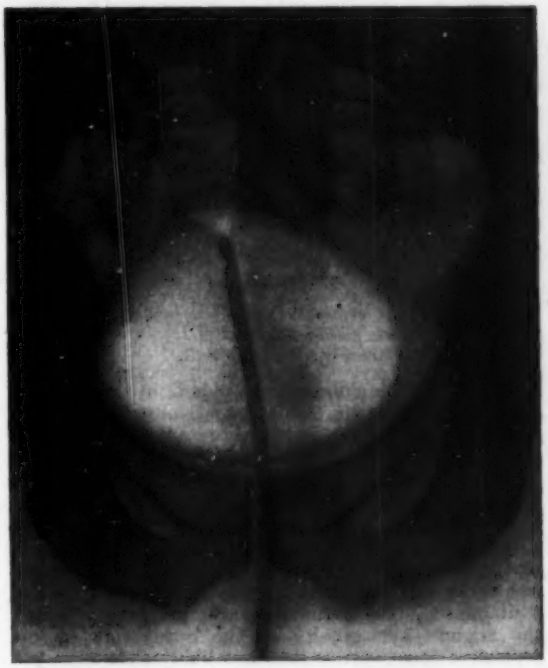

FIG. I.—A normal aerocystogram. Note the well-marked outline of the bladder thrown up by contrast of air with solid tissue.

numerous epithelium cells; no casts; no bilharzia ova. The blood-urea was 55 mg. per 100 c.cm. and MacLean's urea-concentration test showed definite distress of kidney function.

Hæmorrhage prevented cystoscopic visualisation in this particular case, as did also an intractable cystitis following on repeated catheterisation. The provisional diagnosis from the history was one of papilloma of the bladder. That this presumption was wrong is clearly shown by Fig. III. For confirmation of the diagnosis of malignant prostate a suprapubic cystostomy was carried out. The intravesical projection was hard and nodular to the touch, and was spreading up the side of the bladder wall beyond the lateral margin of the trigone on the right side. There was as yet no ulceration. A portion was taken for section, and Dr. E. C. Myott reported: "The gland has become cystic with proliferating papillomatous projections. The lining cells are massed, and have changed in type. Malignant adenoma."

It was decided to treat this case by interstitial irradiation from within the bladder, and 9 × 1 mg. radium needles (length 27 mm. filtered through 0·5 mm. platinum) were used, being inserted through the suprapubic wound. The man appeared to be making good progress, but three days after operation he unfortunately developed a catastrophic pulmonary embolism and died.

The fact that painless hæmaturia may result from an intravesical enlargement of the prostate is noteworthy. Both simple and malignant enlargements may produce this symptom. Persumably it is due to the rupture of the "vesical piles"—i.e., the submucous

venous dilatation resulting from pressure by the growth on the prostatic plexus of veins. With a malignant prostate ulcerating through the bladder mucous membrane, hæmorrhage would also be produced, but owing to the coincident cystitis would not be painless. In the above case the aerocystogram provided the only means of making a certain pre-operative diagnosis.

VESICAL NEOPLASMS

Although in most cases of vesical new growth cystoscopy is satisfactory, it is useful, for the reasons I have stated, to have a second means of diagnosis should it fail. Even a small papilloma can be visualised by aerocystography (Fig. IV.).

The value of this form of diagnosis, however, is not confined to the recognition of the presence of a tumour, for a fair idea of the clinical malignancy or otherwise of the growth can be arrived at, bearing in mind the following essential differences between malignant and benign vesical tumours :—

1. Multiplicity of the growths.
2. Irregularity of their outline on the radiogram.
3. A malignant growth tends to be sessile, whereas a simple papilloma is pedunculated.
4. Infiltration along the bladder wall.

These are the principles which guide us in a cystoscopy or open operation (in the latter, of course, induration is a most important additional factor) and which can also be safely relied upon in interpretation of an aerocystogram, although very often a clinically benign tumour may be histologically malignant.

Villous papilloma may be easily recognised (Fig. IV.). The papilloma may be sessile or pedunculated. Naturally, unless large, the tendrils will not be seen, but these are not necessary for the establishment of a diagnosis. These tumours are rarely situated on the trigone but usually to the outer side of one ureteric orifice ; hence it is not likely that they will be obscured by a prostatic shadow. Often the oblique line of the intramural part of the ureter is

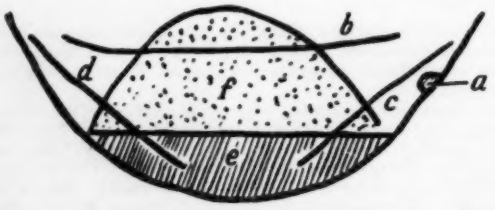

FIG. IV.A.—Diagrammatic representation of Fig. IV. (explained in text).

visible, as it is raised under the mucous membrane by the muscle of Astley Cooper, and the papilloma may be seen lying close to this. This can be quite clearly seen in Fig. IV. On first appearance it is very similar to the spine of the ischium. The following is the case-history :—

CASE 2.—Age 59 years. Twelve months before his admission to the North Staffordshire Royal Infirmary the patient had an attack of scrotal pain, aching in nature, and lasting two or three days. This was unassociated with any urinary disturbance, and after the attack he was perfectly well until a week before admission, when he had an attack of painless hæmaturia lasting three days and then clearing up. There had been occasional pain down the backs of both thighs. Apart from the hæmaturia, micturition was normal, and there was neither frequency nor retention. The bowels were regular, there was no loss of weight, and he was well nourished. The skin was not unduly dry, but the tongue was dry and coated white. There was nothing abnormal in the abdomen. Per rectum there was slight enlargement of the prostate backwards. The surface was smooth and the consistence elastic. The median groove was well defined, and there was no palpable enlargement of the vesicles. The prostate was not tender.

A preliminary diagnosis of vesical papilloma was made, and he was admitted to hospital for investigation. His urine was acid, specific gravity 1014, with a faint trace of albumin. The blood-urea was 52 mg. per 100 c.cm., and the urea-concentration test showed no great impairment of kidney function. The aerocystogram, which was later confirmed by cystoscopy (found possible in this case), revealed a number of highly interesting points. In Fig. IV.A can be seen :—

(1) The papilloma (*a*), lying about half the breadth of the superior ramus of the pubes from the ischial spine and similar to it in appearance. It is a typical "long-distance" photograph of a villous papilloma. It lies just outside the crossing of lines *b* and *c*, representing the left ureteric orifice (*b* is Mercer's interureteric bar, and *c* and *d* two sides of the trigone). The papilloma is sessile in type. (2) A marked enlargement of the middle lobe of the prostate. This is regular and well defined, and is obviously a simple senile hypertrophy. (3) Immediately in front of the latter is a fibrous trigonal "prostatic bar," running between the two sides of the trigone and then terminating sharply. A combination of marked prostatic intravesical enlargement and median bar formation is extremely rare. (4) The bladder wall itself is thin and is beginning to dilate. There is no hypertrophy or fasciculation, and the capacity is 300 c.cm.

CARCINOMA OF THE BLADDER

Thomson-Walker classifies vesical carcinomas according to their macroscopic characters into three groups : (1) malignant papilloma ; (2) nodular growths ; (3) infiltrating growths divisible into (i) squamous epithelioma ("chancroid"), (ii) cylindrical epithelioma or adenocarcinoma (this is rare), (iii) spheroidal-celled carcinoma.

Fig. VII. shows a typical carcinoma of the nodular type. There are five growths, indicated by the figures ; 1 and 2 are the largest and most irregular in outline. They are surrounding the trigone, which is itself clear of growth, a rather typical finding ; all are markedly sessile in character. No villi can be seen. The bladder itself is dilated but not hypertrophied ; its capacity is 550 c.cm. There is no enlargement of the prostate. The comparison of the aerocystographic findings with the history of the case from which Fig. VII. was taken is instructive.

CASE 3.—Age 55 years. Admitted to the North Staffordshire Royal Infirmary with a two years' history of recurrent hæmaturia in the form of small clots at the end of micturition. The hæmaturia was painless. During the periods of freedom there was a constant perineal pain, with scalding pain at the end of the urethra during micturition. There was occasional pain down the left leg, no frequency or retention, but much loss of weight. He was a poorly nourished man. The skin was dry and grey, and there was a definite uræmic odour about him. The tongue was dry and coated white. The abdomen showed no distension of the bladder. There was no palpable enlargement of the kidneys. Per rectum the posterior lobe of the prostate was slightly enlarged and smooth. It was not nodular, and there was no vesiculitis or vesicular enlargement. The prostate was not tender. There was no fixation of the mucosa of the rectum, and the consistency of the prostate was soft and elastic. The specific gravity of the urine was 1016, albumin + +, polymorphs + +, triple phosphates + +, nil on culture. The blood-urea was 37 mg. per 100 c.cm. The blood count showed 3,350,000 red blood-cells, 11,000 white cells ; hæmoglobin, 64 per cent. ; polymorphs, 82 per cent. ; transitional and mononuclears, 5 per cent. ; lymphocytes, 12 per cent. ; eosinophils, 1 per cent. ; anisocytosis +.

Suprapubic cystostomy was performed under spinal stovaine and the aerocystographic findings were amply confirmed. These are represented in Fig. VII.A. Two large papilliferous nodules were discovered in the base of the bladder, one about 4 × 3 cm., the other 3 × 3 cm., the larger being above the smaller and to the right. There are also three smaller nodules, each 1 × 1 cm., as shown. Note the relationship of these growths to the ureteric orifices. A section of one of the growths was taken for biopsy, the pathological report being: "Section shows flattened papillomatous projection. No malignant signs found." In spite of this it was decided to treat the condition as clinically malignant. The choice, of course, lies between cystectomy and radium.

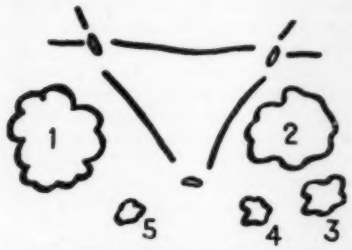

FIG. VII.A.—Diagram illustrating Fig. VII. (see text).

MEDIAN BAR FORMATION

In dealing with this condition in my previous paper I wrote:—

"We are all familiar with the case of the man who has an unmistakably enlarged prostate when examined per rectum but, on opening the bladder, is found to have either no intravesical enlargement or very little enlargement, but nevertheless has a contracture at the neck of the bladder which is responsible for his symptoms. This is the so-called 'prostatic bar obstruction,' 'contracture of the neck of the bladder,' or 'prostatisme sans prostate.'"

Median bar formation is a definite pathological entity about which much has been written in America during the past 15 years, but which has received scant recognition in British journals. Nevertheless, in approximately 10 per cent. of cases of prostatic disease the symptoms of "prostatism" are associated not with a median lobe hypertrophy but with an atrophy of the gland tissue. Rectal examination in these cases as a rule gives no information except an undue firmness in consistency. Cystoscopy and aerocystography alone will establish the pre-operative diagnosis.

Young and Randall did much to simplify the pathology of this condition. Randall at autopsy examined the bladders of 300 men of ages 10–80 years, and discovered 54 cases of prostatic bar. In 18 of these cases (6 per cent. of prostates examined) the bars were very definite; in the other 36 (12 per cent.) they were very small. In the large majority of cases the usual lesion consists of a thickening of the median portion of the prostate posterior to the internal sphincter, and takes the form of a definite bar rising up beneath the mucous membrane of the trigone. The mucous membrane is normal, but beneath it there is an extensive fibrosis and, deeper down, glandular tissue (ducts and acini) in a state of chronic inflammation. Occasionally there is a true prostatic hyperplasia. Sometimes the bar consists mainly of smooth muscle, in others it is thin and leaf-like (Mercier's valve). Young describes the bar as follows:—

"There is usually a slight depression or sulcus on each side of the median bar between it and the lateral margins of the prostate, but in some cases the contour is continuous and the lateral margins of the prostate take part in the fibrosis, so that the condition is a circular fibrotic construction of the vesical orifice; in such cases the term 'contracture of the vesical neck' is quite appropriate. At times one sees a definite bar or valve anterior to the urethra. It is usually less pronounced than the posterior bar, but in rare cases may be more pronounced and sometimes be responsible for most of the obstruction."

In a good many cases there is a history of obstruction from infancy. Always with median bar formation there is a coincident infectious process, pointing to chronic prostatitis as the probable underlying cause. About one-third of the patients give a history of previous gonorrhœa.

Median bars may be classified as:—

(1) *Fibrous.*—Divided into two types: (*a*) urethral; (*b*) trigonal.

(2) *Glandular.*—Divided into two types: (*a*) hypertrophy confined to the posterior prostatic commissure under the sphincter, producing a thick broad bar; (*b*) arising from the subcervical glands of Albarran and lying within the sphincteric ring, forming a small prostatic lobule. Occasionally a large intravesical lobe is formed.

The tissue removed by punch operations shows microscopically a round-cell infiltration in 35 per cent. of cases, a chronic fibrosis in 12 per cent., and muscular hyperplasia in 1·7 per cent. (Young.) All are inflammatory with the exception of a small group of congenital cases (2 per cent.). The lesion consists largely of peri- and intra-acinous infiltration with round cells and occasionally cystic dilatation and intra-acinous epithelial growth similar to that seen in hyperplasia of the prostate. The inflammatory infiltration may invade the musculature quite distant from the mucosa and may eventually replace the muscle by fibrosis.

The diagnosis of these cases is based on a history similar in most respects to that of a typical "enlarged prostate," although sexual symptoms are negligible. There is difficulty and frequency of micturition. Per rectum, however, all that can be felt is a small indurated prostate which gives no help, and identification must rely on a cystoscopic examination or on the aerocystogram. I have given above the conditions which may prevent cystoscopic examination (cystitis very frequently complicates this condition), although it must be admitted that with a small meatal glandular bar cystoscopy is of more value, as it could quite easily be missed in an aerocystogram; further, the catheter might obscure the visibility at the meatus. The radiograms of two prostatic bars are shown, and these are both of the fibrous trigonal type (Figs. IV. and V.). Fig. IV. has already been described. The following is the case-history relating to Fig. V.:—

CASE 4.—Aged 76. Admitted to hospital with a twelve months' history of frequency of micturition, both diurnal and nocturnal (5-6 times during the night). For a week before admission the difficulty had gradually increased, and on each occasion he had passed less and less urine. Every time he micturated he felt that he had not completed the act and emptied the bladder. In other words, he was suffering from the symptoms of prostatism. There was no history of hæmaturia, no drowsiness, headache, or pain in the back, no sexual neurosis, no loss of weight. The bowels were constipated. On examination he was a well-nourished man; the skin was not dry, but the tongue was dry and coated brown. The abdomen showed no distension of the bladder. There was no tenderness over the costo-vertebral angles and no palpable renal enlargement. Per rectum the posterior lobe of the prostate was only slightly enlarged; it was indurated but not nodular, and the median groove was well-defined. There was no fixation to the rectal mucous membrane, and no tenderness or fluctuation. The seminal vesicles were not palpably enlarged or tender. The specific gravity of the urine was

1012; albumin +; phosphates +. Blood-urea, 60 mg. per 100 c.cm. MacLean's urea-concentration test showed a maximum concentration of 2·25 per cent. and a minimum concentration of 0·33 per cent.

Clinically, one would have thought a diagnosis of intravesical enlargement of the prostate was fairly obvious—i.e., apart from the absence of marked palpable enlargement per rectum. The aerocystogram was taken as a routine, and with a most interesting result, for it showed a condition which could not have been diagnosed in any other way apart from cystoscopy. Owing to the comparative infrequency of prostatic bars the result was also somewhat of a surprise. The interpretation of this aerocystogram is very easy. The bladder is small, being in "systole" (capacity 150 c.cm.); the wall is not hypertrophied but is mottled from chronic cystitis. No intravesical enlargement of the prostate is made out, but an unmistakable trigonal bar is visible. Its height is about one-ninth that of the bladder as shown in the film, and it lies in the internal trigone. The upper margin is straight and runs from side to side behind the meatus. The diagnosis is made at a glance, for no other condition can possibly be mistaken for it. Suprapubic cystostomy confirmed the diagnosis. In Fig. IV. and exactly similar condition is seen.

Transurethral surgery, of which we have heard so much recently in this country, was initially introduced for the treatment of median bar obstruction. Young advised a punch, Geraghty a sphincterotome, and Braasch a median bar excisor. With the advent of the high-frequency cutting current, Collings and Wapplers invented for this purpose an electrode which could be used through a direct cystoscope. This instrument has also been used for the division of the dense adhesions which occasionally follow prostatectomy.

SUMMARY AND CONCLUSIONS

(1) The value of aerocystography as an aid to diagnosis of intravesical enlargement of the prostate is confirmed. The disadvantages of cystoscopy in certain cases are reiterated, and the simplicity of the air-in-bladder technique noted.

(2) The interpretation of a prostatic shadow is clarified, and the ease with which distinction between simple and malignant prostates may be made is especially emphasised.

(3) New growths of the bladder are also visualised by this procedure, and an attempt is made to correlate the aerocystographic appearances (corresponding to the morbid anatomy) with the histological anatomy of these neoplasms.

(4) Reference is made to "median bar" formation, and diagnosis by aerocystography in certain types (trigonal bars) is described. In the meatal bar cystoscopy is a preferable means of diagnosis. The existence of median bars should be more widely known; hence the full description I have given of them. I acknowledge much indebtedness in this matter to the writings of Young and Randall, whom I have quoted freely. This very interesting pathological entity has been elucidated by their work.

(5) Finally, I might add the disappointment we feel that this most valuable adjunct to diagnosis is not more widely known and used. During the 18 months that this diagnostic method has been in use at the North Staffordshire Royal Infirmary it has not failed to help us in a single instance where any of the conditions described above has been present. Exploration of the bladder has always been deferred until the preliminary aerocystographic reading has been made; the justification of a standard routine in its employment has been definitely established.

My sincere thanks are due to Mr. T. H. Richmond and Mr. F. W. Duthie, hon. surgeons at the North Staffordshire Royal Infirmary, for their permission to publish this work. The material has been abstracted from patients under their care in the hospital, and their assistance and advice has been invaluable; to Dr. J. F. Bromley, hon. radiologist, I also owe a debt of gratitude for his radiographic help; and to Sister Jones for her patience and stimulating enthusiasm.

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LEGENDS TO ILLUSTRATIONS ON PLATE

DR. ROSS

(*Radiograms by* Dr. J. F. BROMLEY)

FIG. II.—Benign intravesical enlargement of the prostate. Note the hypertrophy and crenation of the bladder wall and the well-marked projection that the median lobe of the prostate makes. The bladder musculature is passing from the stage of systole to diastole.

FIG. III.—Malignant prostate. Note the irregularity of the shadow and the marked distension of the bladder wall, which is also very atrophied. There is a well-marked phlebolith to the left of the prostatic shadow. See text for full description.

FIG. IV.—Aerocystogram showing a combination of (*a*) simple papilloma of the bladder, indicated by arrow on right; (*b*) median lobe hypertrophy of the prostate; and (*c*) median bar formation. See text for full description.

FIG. V.—Fibrous trigonal bar formation. The bladder wall is hypertrophied and fasciculated, and in systole. The fluffiness of the interior of the bladder is due to chronic cystitis with alkaline incrustation.

FIG. VI.—Fairly well-marked benign hypertrophy of the prostate with multiple calculus formation. Note the very distended bladder. The fundus has been pushed over to the right, probably by the sigmoid colon.

FIG. VII.—Carcinomatosis of the bladder. Note the irregular masses which are obscuring the base. The bladder is much distended. See text and diagrammatic representation for full details.

DRS. RODGERS, PECK, AND JUPE

FIG. I.—Radiogram showing the leg bones of a child under treatment for tuberculous disease, taken for comparison. At the ends of the bones lines of temporary cessation of growth due to illness show as slightly denser areas, but are easily distinguished from deposits of lead.

FIG. II.—Patient at the time of admission, showing dense "lead lines" at the growing ends of the bones of the leg.

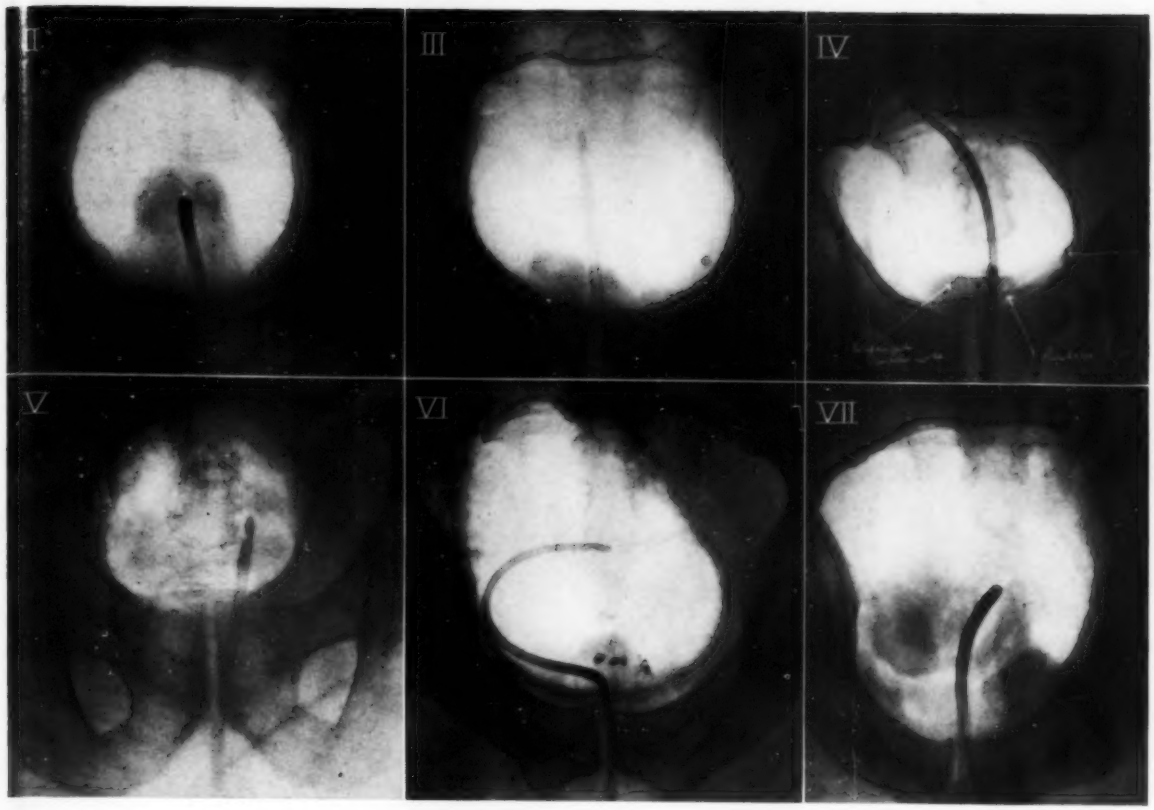
FIG. III.—Patient five months after admission, showing normal bone laid down to the epiphyseal side of the lead lines.

FIG. IV.—Lead lines in bones of forearm on admission.

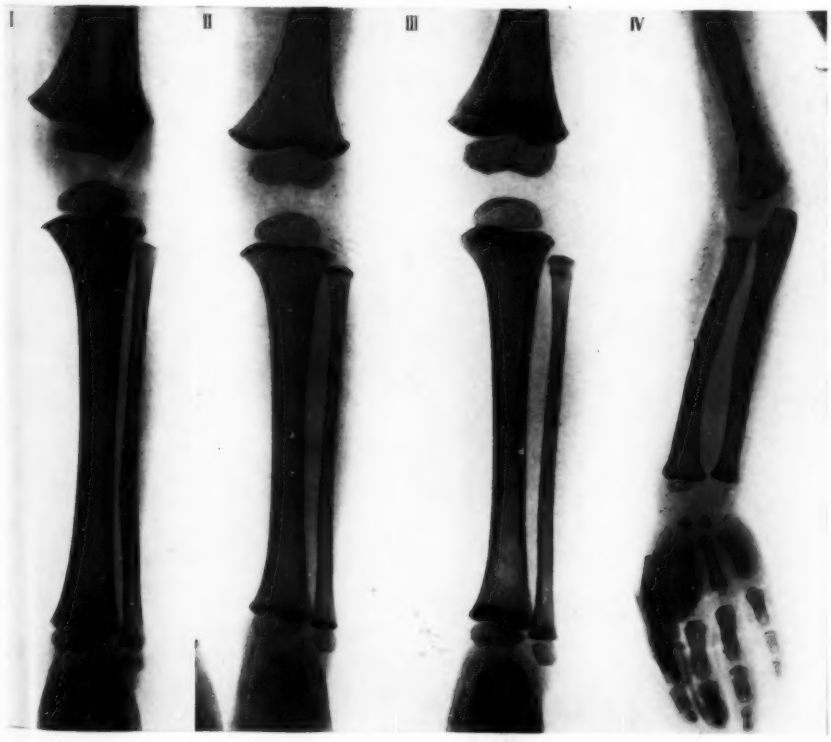
DRS. PLATT AND OWEN

FIG II.—Radiogram showing rickety changes in bones of forearm, with calcification of arteries.

DR. ROSS: AEROCYSTOGRAPHY



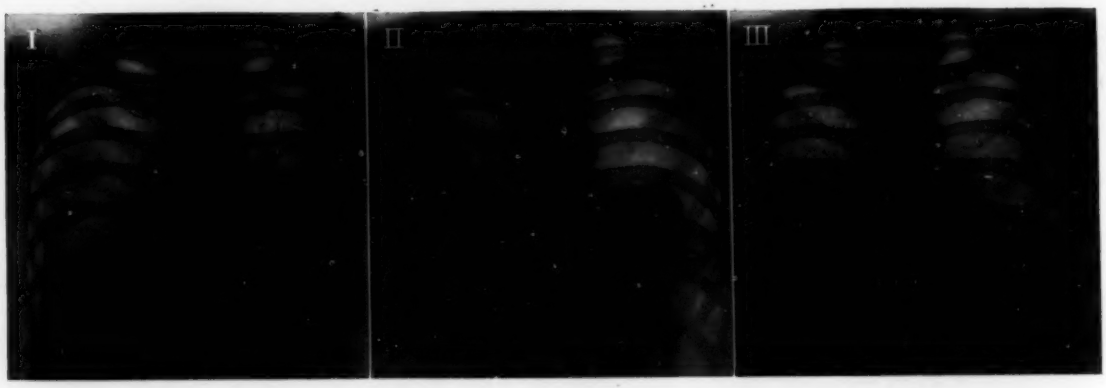
DRS. RODGERS, PECK, AND JUPE: LEAD POISONING



DRS. PLATT & OWEN: RENAL DWARFISM

II

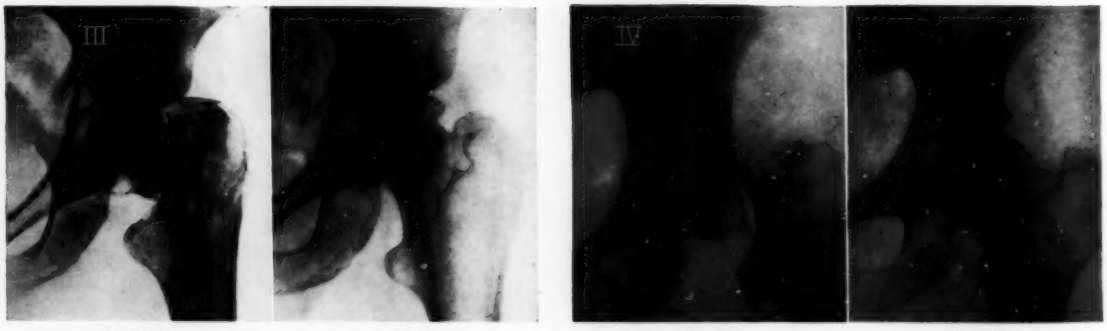
DR. WILSON: BILATERAL SPONTANEOUS PNEUMOTHORAX



22.iv.32. 3.v.32. 30.viii.32.

MR. McFARLAND: FRACTURES OF NECK OF FEMUR

17.iii.30. 28.xii.33. 18.i.32. 5.ii.34.



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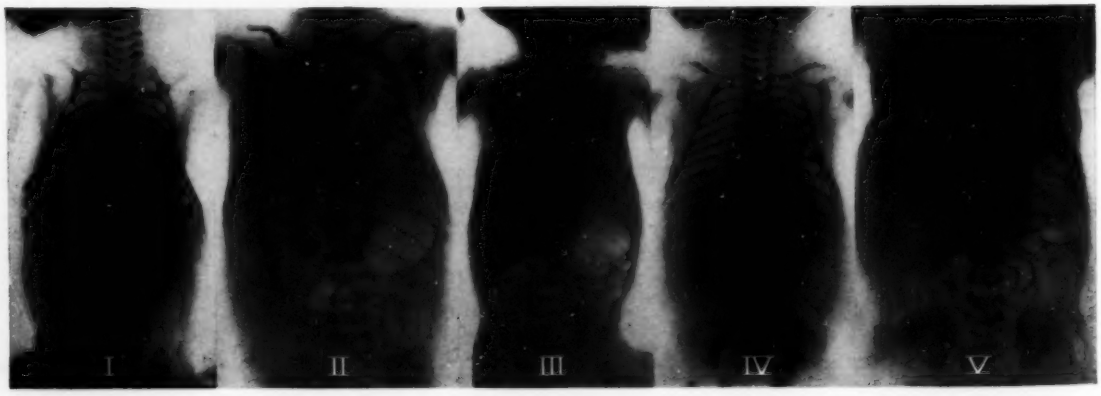
DR. HAJKIS: RADIOGRAPHIC EVIDENCE OF LIVE BIRTH



LEAD POISONING IN CHILDREN

WITH A CASE RECORD

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(WITH ILLUSTRATIONS ON PLATE)

The importance of radiography in the diagnosis of lead poisoning in children is illustrated here by a case report, and a brief outline is given of the effects of lead on the body and the clinical aspects of poisoning in children.

Lead poisoning has been known since Hippocrates described a case of lead colic in an extractor of metals some 300 years before the birth of Christ. Cases of poisoning due to contaminated wine have occurred in France for 400 years, and in the early part of the eighteenth century an epidemic of poisoning due to lead used in the storage of cider occurred in Devonshire. In 1839 was published by Tanquerel des Planches the first complete clinical description of lead poisoning based on over 1000 cases, and recently our knowledge of the metabolism of lead has been enriched by the researches of Aub and his associates in America. During the last 25 years, owing to the improvement in industrial hygienic conditions, there has been a great decrease in the incidence of this, the most common, form of industrial poisoning.

White lead, used in the making of face powder, has been a source of poisoning among nurslings in Japan for over two centuries, and, although a form of serous meningitis was recognised in 1901 by Hirota [1] as a definite clinical entity, it was not until 1923 that I. Hirai [2] found the cause to be lead. In Queensland, Australia, the lead used in painting verandah railings is readily powdered by the hot dry atmosphere and has been reported as a cause of many cases of poisoning in children, since Gibson, Turner,[3] and others drew attention to this danger some forty years ago. Now, since the use of lead-containing paints has been limited by law, the incidence of poisoning has been reduced considerably.

In America the first case of lead meningitis to be described was published by Blackfan and Thomas [4] in 1914, and this was followed shortly afterwards by further reports from Strong,[5] Norton,[6] Holt,[7] and others. Since then lead poisoning among children has been recognised with increasing frequency, and in the decennial period 1924–1933 no less than 89 cases have been seen in the Boston Children's Hospitals (McKhann and Vogt [8]). The radiographic changes found in the long bones and described by Park [9] in 1930 have made diagnosis easier and more certain, and no doubt account in part for this increase. John Thompson [10] published in 1925 an article entitled "Peculiar fatal convulsions in four children whose father suffered from lead poisoning." He considered them cases of congenital lead poisoning but there was not sufficient evidence for a definite diagnosis to be made, and plumbism in the child from paternal poisoning is no longer considered a possibility. We have found no other reference to lead poisoning in children in the English literature since 1890, and the case here recorded is the first diagnosed in the wards of the London Hospital. It may be that lead poisoning is not really so rare among children in England but merely that it is overlooked.

Apart from industry, lead poisoning occurs more commonly in children than among adults for three reasons. The young child frequently conveys to his mouth anything he can get hold of, and of the 89 cases mentioned above 72 were between the ages of one and three years. Also pica, or perverted appetite, whether from mental deficiency, ill-health, or habit, has been noticed in many of these cases (Ruddock [11]). Again, children are very liable to suffer from acidosis, and this may precipitate toxic manifestations in a case of latent poisoning. Further, it has been proved experimentally in animals that the young are very susceptible to lead, and in a recent epidemic of poisoning in Boston due to the burning of storage battery cases as fuel, of the 40 cases only 3 were adults although adults and children were equally exposed to the lead fumes (B. Williams et al.[12]).

Lead paint from furniture, woodwork, or toys has been the commonest source of poisoning, and in America, owing to the number of cases of poisoning from this origin, it is no longer used in the manufacture of cribs and the better-class toys. Toys made of lead have not been mentioned as a cause of poisoning, rather unexpectedly, considering how common such toys are. They were the probable source of poisoning

LEGENDS TO ILLUSTRATIONS ON PLATE

DR. WILSON

Fig. I.—*Right:* Deep-seated disease which gradually becomes thinner towards lung surface. Spontaneous pneumothorax, shown along the whole of the outer surface of the lung, regular in outline. No fluid in pleural space. *Left:* Peribronchial thickening and fine nodular disease. *Heart:* Slightly to the left.

Fig. II.—*Right:* No sign of spontaneous pneumothorax. *Left:* Almost complete collapse of lung due to spontaneous pneumothorax. Note the two lobes and the absence of pleural or interlobar adhesions. *Heart:* Normally situated.

Fig. III.—Left pneumothorax again developing but not causing complete collapse.

MR. MCFARLAND

Fig. I.—Old ununited fracture treated by modified Lorenz osteotomy and immobilisation.

Fig. II.—Impacted fracture treated by immobilisation.

Fig. III. (Case 4).—Subcapital fracture treated by accurate apposition and immobilisation.

Fig. IV. (Case 5).—Subcapital fracture treated as described above.

DR. HAJKIS

Fig. I.—Radiogram of stillborn child. Complete atelectasis. No air in intestinal tract.

Fig. II.—Air in stomach and intestines after five minutes of life. Heart beat for five minutes, and the child made three respiratory efforts. (Spontaneous vertex delivery, but mother had lobar pneumonia.) Routine treatment for asphyxia included Marshall Hall and Byrd's methods and mouth-to-mouth insufflation. Radiogram shows aeration of the margins of the lungs but atelectasis elsewhere.

Fig. III.—Five hours alive. Aeration of right apex and margins, atelectasis elsewhere. No insufflation. Air in stomach and intestines.

Fig. IV.—Stillborn child. Radiogram taken 72 hours after insufflation. Air in stomach only.

Fig. V.—Lungs expanded but less translucent than normal. No insufflation. Air in stomach and intestines.

in our case. Lead foil, food contaminated from kitchen utensils, or water from lead pipes are other less frequent sources. Lead-containing ointments, lotions, plasters, and dusting powders applied to the breasts, and lead nipple shields have caused poisoning in breast-fed infants. In Manchuria lead meningitis was said to be the fourth most common of all causes of death, and the origin of the poisoning was the toilet powder used by the mother (Suzuki and Kaneko [13]). Lead carbonate forms an opaque base, spreads smoothly, and, being cheap, was often used for the inferior grades of powder.

Lead absorbed by the respiratory tract gives rise to rapid and severe poisoning, and has especially to be guarded against in industry. Among children almost all cases have been due to absorption by the intestinal tract, and, though absorption through the skin is possible, it is slow and of little practical importance.

ACTION OF THE POISON

It is probable that lead is conveyed in the blood as colloidal lead phosphate which at the normal pH of the blood is very stable but by slight changes in the reaction, especially towards acidity, is easily converted into the more soluble di-lead salt. In cases of latent poisoning this probably accounts for the sudden development of toxic symptoms during an acidosis induced, for example, by an infection, as in the case described here, or by attempts at "de-leading" the patient. During absorption lead is found distributed throughout the body, but when absorption has ceased, and when there is no symptom of poisoning, it is found mainly in the bones as tertiary lead phosphate and sometimes in the keratin-containing substances, nail and hair (K. Kato [14]). Lead stored in the bones is apparently harmless. Aub [15] has shown that the metabolism of lead and calcium in the body is similar, and on this basis rests the modern treatment of lead poisoning. Factors favouring the storage of calcium in the bones, such as vitamin D and an adequate and balanced phosphorus-calcium intake, will also aid the deposition of lead, and so will be of use in the acute phases of poisoning when lead is widely distributed. In latent poisoning when attempts are made to rid the body of lead, those measures which cause an increased excretion of calcium may be used; of these Aub and Hunter [16] have shown that Parathormone is the most potent, and the liberation of comparatively large amounts of lead by this means, for some unexplained reason, is not accompanied by signs of poisoning. This action of parathormone, however, is found only on the first injection, a second injection causing no further excretion of lead. Acids or acid-forming salts will cause an excretion of lead, which is increased by giving a low calcium diet, while alkalis and potassium iodide have a similar though less pronounced effect without the need of a special diet. Shelling [17] has shown that magnesium hinders calcification and therefore, probably, the deposition of lead, for which reason it should not be given parenterally to cases presenting symptoms of acute poisoning.

Lead is excreted mainly by the bowel and to a less extent by the kidneys; the gall-bladder is also probably concerned in its excretion but only to a slight extent. Lead found in the fæces may have passed through the intestinal tract unchanged, but lead found in the urine proves absorption, and is therefore of great diagnostic importance.

That anæmia is associated with lead poisoning was noted by Laennec in 1831; stippling was described by Ehrlich in 1885, and its relation to plumbism demonstrated by Behrend in 1899, but the mechanism of this change has only recently been made known. Lead changes the colloidal state of the cell surface by a deposition of insoluble lead phosphate and a local production of acid; this causes a shrinkage and hardening of the cell wall which, while making it more resistant to changes in osmotic pressure, makes the cell more brittle and less sticky. The effects of these changes are seen in the resistance of "leaded" cells to low concentrations of saline, and the absence of agglutination frequently found with sera of the various agglutinating groups. The brittle cells, unable to withstand the trauma inflicted in circulation, are readily destroyed, and so is produced a hæmolytic anæmia. To this is due the increase of pigment in the blood, bile, and urine which is sometimes found, and the compensatory erythroblastic reaction in the marrow, evidence of which may be found clinically in the high reticulocyte count of the blood. Lead, always prone to attack the young cells, produces in these reticulocytes a clumping of the basophilic substance of the cytoplasm to which the appearance of stippling is due.

The blue line of the gums is due to a subepithelial deposit of lead sulphide. The circulating tertiary lead phosphate is converted locally into the very soluble di-lead salt by slight changes in the reaction of the tissues, and this combines readily with hydrogen sulphide which diffuses through the gums, being formed from the decaying protein of food material left in the crevices between the teeth. The lead line, as would be expected, is rarely seen when the teeth are kept clean, and is not found in the herbivora.

The damaging effect of lead on the germ cell is well known, producing abortion or weakly offspring. Lead colic is due to its action on smooth muscle. In vitro there is an inhibition of motility and an increase of tone, which explains the constant association of colic and constipation. The primary changes in lead palsy are now known to be in the muscle, such changes as are found in the cord and peripheral nerves probably being the result of paralysis of the muscles supplied. Lead, circulating as insoluble colloidal phosphate, meets the lactic acid of fatigued muscle and is precipitated on the cell surface as lead phosphate by reacting with the inorganic buffer phosphate of the cell; this changes the properties of the cell surface and leads to lead palsy. It has long been known that the muscles most used are those most often paralysed.

In lead meningo-encephalopathy the most important change is an intense cerebral œdema which explains all the symptoms of depression and excitation of the brain found in these cases, and may lead to death from medullary compression, or the ischæmia produced may later result in extensive cerebral atrophy, demonstrated by McKhann in one case by means of an encephalogram two years after the onset of poisoning. This cerebral atrophy is the cause of such nervous sequelæ as mental deficiency, paralyses, and spontaneous movements. In many cases there is evidence of a sterile meningitis in the neck rigidity and increase of cells in the cerebro-spinal fluid, and a proliferative meningitis has been demonstrated post mortem. The cerebro-spinal fluid is under increased pressure, and there is a moderate increase of the total protein. The cell count is nearly always raised, from 20–100 cells per c.mm., but it may be normal.

THE CLINICAL RESULTS

Acute poisoning due to the rapid absorption of large amounts of lead is rare and the symptoms mainly gastro-intestinal, to which are often added signs of cerebral disturbance such as are found in

the encephalopathy of chronic poisoning (D. D. Stewart [18]). Other of the toxic episodes of chronic poisoning may occur, and an acute hæmolytic anæmia of varying severity has been found in some cases.

The repeated ingestion of small amounts of lead may produce signs of absorption such as a "blue line" on the gums, and changes in the radiological appearance of the long bones, without producing any signs of intoxication. This state of latent poisoning is found more often among adults than in children, the young being relatively more susceptible to lead. The amount of lead absorbed, the pH of the blood, and idiosyncrasy are other factors influencing intoxication.

The disturbance of health produced by chronic poisoning causes such general symptoms as constipation, vomiting, loss of appetite, and irritability, which is often extreme. These symptoms, usually insidious in onset, are found a varying period after absorption has begun. A secondary anæmia is a constant accompaniment, but punctate basophilia, though usually well marked, is not an invariable finding. It occurs in over three-quarters of the cases according to Holt.[19] Evidence of hæmolysis (hæmoglobinuria, hæmatoporphynuria, and increase of bile-pigments in the blood) and of marrow regeneration (reticulocytosis) are sometimes found. The "blue line" though an important diagnostic point is not often seen in children, and Kato reports the occasional finding of blackened teeth and nails in babies in Japan.

The toxic episodes which may occur in the course of chronic poisoning are colic, peripheral limb palsies, papillœdema and ocular palsies, and meningo-encephalopathy. It is these acute phases of intoxication, particularly encephalopathy, which are so often produced in children by an infection or other factor giving rise to an acidosis.

Colic in children is not often reported, but this may be due to its passing unrecognised and may account for the marked irritability sometimes found. Paralysis of the limbs is uncommon except in Queensland where, according to Nye, its frequent occurrence has earned for it the popular name of "the dangles." Unlike the adult, the paralyses in children are found more in the lower than in the upper limb, presumably because in children the legs are more fatigued than the arms. Pains and reflex changes may accompany the weakness.

Lockhart Gibson [20] has drawn attention to the effects of lead on the eye, and regards these conditions as common, though other writers consider them rare. Papillœdema and ocular palsy are found usually with encephalopathy, though they may occur alone. Optic atrophy sometimes results when these cases are left untreated, but the ocular palsies always recover.

Lead encephalopathy is the most serious of the acute manifestations of poisoning in children, and is common, having occurred in 45 of the 89 cases mentioned by McKhann. The symptoms caused by the acute cerebral œdema are those of a raised intracranial pressure with depression and excitation of the brain. There is headache, vomiting, papillœdema, and a bulging fontanelle with stupor or coma. There may be paralyses of the ocular or limb muscles, and the children are sometimes delirious or tremulous. Convulsions and twitching are common and have been noted to occur in groups. In many cases there are, in addition, signs of meningeal irritation such as neck rigidity and head retraction, and this may be reflected in the cerebro-spinal fluid by a pleocytosis. The fluid is always under increased pressure and the protein content is raised, but the rise in cell count is not constant. Fever which is often present is due in most cases to an accompanying infection.

The prognosis in encephalopathy is serious: of 20 cases recorded by Holt 11 died and only 1 escaped permanent cerebral damage. Mental deficiency, convulsions, blindness from optic atrophy, and cerebral palsies have all resulted from the ischæmia produced during lead encephalopathy by the acute cerebral œdema. Apart from such nervous sequelæ, little has been noted of the late effects of lead poisoning, but Nye [12] believes that in Queensland chronic interstitial nephritis in children is commonly due to lead poisoning earlier in life. Among 80 consecutive cases of chronic interstitial nephritis he found 14 patients who had been treated in childhood for lead poisoning. Another late effect he has noticed is renal dwarfism.[22] In chronic poisoning lead is not always found in the excreta, but if an injection of parathormone be given and several days supply examined a positive result is more likely. Recently Shipley has published a spectroscopic method of detecting minute amounts in the blood.[23]

RADIOGRAPHIC AND OTHER MEANS OF DIAGNOSIS

In 1930 Park, followed shortly afterwards by Vogt [24 25] and Caffey, described the radiographic changes produced by lead in the bones of children and young animals. These changes appear as a band of increased density at the diaphyseal end of the growing bone, most marked where the growth is greatest (Figs. II. and IV.). The outline of the bone is unchanged and there is no evidence of irregularity at the epiphyseal junction or of raising of the periosteum. The epiphyses are quite normal. The degree of opacity and the width of the dense band varies with the amount of lead absorbed and the length of time that the absorption has been taking place. As the bone grows, the band tends to become wider and less well defined. The density is due to the deposition of lead in the bone chiefly and also to the condensation of the traveculæ. If the absorption of lead ceases, an area of bone of normal density appears on the epiphyseal side of the "lead line" (Fig. III.). As the metal is deposited only in the growing bone the changes are not seen in adults.

Similar, but not identical, appearances are seen in scurvy, congenital syphilis,[26] Albers-Schönberg's disease ("marble bones"), and in poisoning by vitamin D and elementary phosphorus, and a few cases have been reported where other heavy metals such as strontium and bismuth have been the cause. The clinical features in these conditions are usually sufficiently distinct to avoid confusion.

In scurvy, the fact that the band of density is not wide and has a zone of rarefaction behind it should make the diagnosis clear, and the "ground-glass" appearance of the bones and, in some cases, the presence of subperiosteal hæmorrhages may be noted; in addition the deformity at the joint and the pain help to confirm the diagnosis.

In congenital syphilis the periosteum is raised in a large percentage of cases and there may be changes at the ends of the diaphyses ranging from slight irregularity to actual destruction. In this condition also there is a dense line at the end of the bone, but it is narrow and has an area of lessened density just behind it.

Albers-Schönberg's disease is rare and must be distinguished by the history and clinical methods; this also applies to poisoning by other metals. In some cases of Albers-Schönberg's disease there is widening of the end of the bone, best seen at the lower end of the femur, and the presence of this makes diagnosis more easy.

In healing rickets the dense band is not so clean-cut and not so even in width, and in most cases the "saucer-

shaped" deformity can still be traced for some time after the healing has taken place. Here again the history is of great importance and no difficulty is likely to arise.

There are three types of cases in which lead poisoning may be suspected. First may be mentioned cases of convulsions of obscure origin or cases of sterile meningitis. Rickets with convulsions and tuberculous meningitis have been most frequently mistaken for this type of case. Secondly, cases showing papilloedema, with or without ocular palsy, for which no cause can be found. And lastly anæmic children who suffer from colic, constipation, and irritability, or in whom signs of peripheral limb palsy are found.

In the diagnosis of a suspected case of poisoning a history of having ingested lead in some form is important and is usually obtained. A lead line, though uncommon, is pathognomonic of plumbism. Stippling of the red cells with a mild secondary anæmia is one of the most constant diagnostic points, but the stippling varies considerably from day to day so that repeated search may be necessary. Stippled cells occur in other conditions, but their numbers are always very small compared with those found in lead poisoning. Another useful aid to diagnosis is radiography; lead paint has been seen in the intestines by this means, showing as "fleck" shadows mixed with the intestinal contents, and the typical bone changes may be found. Lastly, the blood, urine, and fæces may be examined for lead, and although its presence cannot always be detected it is found in the majority of cases.

TREATMENT

The treatment of lead poisoning in children is mainly the treatment of lead encephalopathy. First, all sources of lead should be removed, and, as one attack of acute intoxication predisposes to others, the child should in future be guarded carefully against further risks of poisoning.

The immediate aim of treatment is the lowering of intracranial pressure to safe limits, and the first and most useful means employed is the withdrawal of cerebro-spinal fluid by lumbar puncture. The injection of hypertonic solutions, theoretically justified, seems to have proved disappointing. Despite the objection raised by Shelling to the use of magnesium salts, a 25 per cent. solution of magnesium sulphate has been injected intramuscularly up to a dose of 0·2 g. per kg., and this drug, in addition to its action as a hypertonic solution, acts as a nervous depressant by virtue of its magnesium ion, and would be of use in cases of convulsions. In animals the depressant action of magnesium can be abolished immediately by the injection of an equal concentration of calcium, an antidote which should make this a safe method of treatment. A 15 per cent. saline solution or a 25 per cent. solution of glucose in normal saline may be given intravenously in doses of about 50 c.cm. to a child of 5 years. Any of these solutions may be administered rectally and, if they are retained for over half an hour, they exert a similar though slower and less pronounced action. In cases where convulsions and delirium are prominent features, sedatives should be given in addition to the above treatment.

The next most important point in treatment is to aid the rapid deposition of lead in the bones, and to this end calcium is used and is best given by an intramuscular injection of 5 to 10 c.cm. of 10 per cent. calcium gluconate. Later calcium lactate may be given by the mouth and a diet rich in milk. Measures to prevent an acidosis include the giving of alkali and the avoidance of starvation. Recently Shipley has shown that, although the normal diet of an infant contains sufficient phosphorus for his every-day needs, when the calcium intake is suddenly increased it tends to upset the calcium-phosphorus balance and cause an increased loss of both. He has proved experimentally that the giving of phosphorus and vitamin D will prevent rats from being poisoned by doses of lead that killed others not so protected. The phosphorus and vitamin D both act by increasing the deposition of lead, as of calcium, and therefore on theoretical grounds should be given.

The removal of the source of poisoning, hygienic surroundings, and an adequate diet with added vitamin D and perhaps calcium and phosphorus are advisable.

Many attempts at de-leading patients have been made by such means as the giving of a low calcium diet, the production of an acidosis, and the use of potassium iodide or parathormone, but such attempts in children are contra-indicated because of the danger of precipitating one of the toxic episodes. It is not possible to rid the body of all lead, and as lead deposited in the bones is harmless it is best left there to be retained or to be excreted spontaneously.

A CASE-HISTORY

A boy, aged 2 years, was admitted to the London Hospital on Oct. 13th, 1933. He was said to have been well till the age of 8 months when he had an attack of broncho-pneumonia, followed a few months later by a second attack with measles. Since then he had had repeated attacks of bronchitis and sore-throat, sometimes complicated by diarrhœa and vomiting. As far as can be judged his mental condition was normal. In the last six months he had been pale and irritable and had been treated as a case of "nutritional anæmia." A blood count six months before admission showed 5,000,000 red blood-cells and 48 per cent. hæmoglobin (Dare, normal = 85 per cent.), and five months later, despite iron therapy, the red blood-cells and hæmoglobin had fallen to 4,000,000 and 40 per cent. respectively. He had always been underweight, but his condition had deteriorated further during the last few months. He had become more irritable and suffered from attacks of screaming thought to be due to colic.

Some 16 hours before being brought to hospital he is said to have fallen in a fit and he was still unconscious on admission. The mother had noticed that of late he had developed a habit of eating dirt and chewing at whatever he could lay his hands on. She brought to hospital a bag of "tin soldiers," many of whom had lost their limbs and their coats of paint and were tooth-marked.

On examination he was comatose with widely dilated, non-reacting pupils and absent deep reflexes. The temperature was 101° F. and a definite tonsillitis was present. The discs and fundi appeared healthy and no abnormality was discovered in any of the other systems or in the urine. There were no signs of rickets or tetany, nor was there a "blue line" present. After a lumbar puncture the child became semi-conscious and twitching movements, which sometimes became generalised convulsions, were noted frequently during the first day. The fluid was under increased pressure but was normal apart from an increase of the total protein content to 0·09 per cent. Sedatives were given, an intramuscular injection of 5 c.cm. of 10 per cent. calcium gluconate, and 8 oz. of 20 per cent. magnesium sulphate solution rectally, but little of this last was retained. None of these measures produced any striking change in the patient's condition.

After two days of restless delirium a further series of convulsions occurred during the third day and two further lumbar punctures were performed. The child's condition then gradually improved, but he appeared to be mentally deficient and would put anything within reach into his mouth. For the first two weeks there was a mild irregular fever, but later the general condition improved and he was discharged a month after admission looking somewhat pale but otherwise fairly well apart

from his appearance of mental deficiency. He was treated after the first few days with calcium lactate, grs. 5 three times a day, and care was taken to avoid producing an acidosis.

A blood count performed three days after admission showed 5,000,000 red cells, 40 per cent. hæmoglobin (Dare), and 19,800 white blood corpuscles, 57 per cent. of which were polymorphonuclear cells. An abnormal degree of punctate basophilia was seen in later films. The fragility of the red cells was normal. No lead was found in the urine or fæces. X ray examination of the long bones showed the areas of increased density at the ends of the diaphyses, sometimes called "lead lines" (Figs. II. and IV.).

Readmission.—Five months after discharge the child was readmitted for further investigation. In this interval he had gained no weight and remained pale, but there were no abnormal physical signs apart from enlarged septic tonsils. From his aspect and behaviour it was obvious that he was mentally deficient and still suffered from pica. He had been guarded from all possible sources of lead, and had been treated with grs. 5 doses of iron and ammonium citrate and 5 minims of Radiostoleum three times a day. There had been no convulsions or colic, and no paralysis or "blue line" had appeared. A blood count still showed a considerable degree of anæmia: red cells 3,400,000, hæmoglobin 46 per cent.; no punctate basophilia. Radiography of the long bones showed that the "lead lines" were now some distance from the ends of the bones and had widened as a result of growth at the bone ends (Fig. III.).

Three intramuscular injections of 5 units parathormone (Lilly) were given over a period of four days, and the fæces collected for a week which included this period. On analysis by a modification of Fairhall's chromate method large amounts of lead were found.

The child was last seen on June 1st, 1934, when little change was noted in his condition.

SUMMARY

(1) A case is reported demonstrating the value of the radiological changes at the ends of the long bones as a sign of lead poisoning in children. (2) Lead is a possible source of poisoning in the home, especially that found in paint. (3) Lead is stored in the bones and while it remains there is harmless. Only during absorption and excretion do toxic symptoms appear. (4) The possibility of lead poisoning should be considered in cases of convulsions of obscure origin, of papillœdema and ocular palsy without obvious cause, and in cases of anæmia with colic or peripheral limb palsy.

Since lead is commonly found in the home within the reach of children it is surprising that more cases have not come to light, and the possibility of such cases passing unnoticed has prompted us to record this case.

We are indebted to Dr. A. G. Maitland-Jones for his permission to publish this case, and to Dr. Donald Hunter for advice and interest, and to Dr. J. R. Marrack for his skill and patience in tracing the lead excreted.

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FRACTURES OF THE NECK OF THE FEMUR

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(WITH ILLUSTRATIONS ON PLATE)

In three years 24 cases have been treated. They fall into three main groups: old fractures and recent fractures either low or high in the neck.

(1) *Old fractures* with absorption of the neck and established non-union. (5 cases). It is usually impracticable to obtain union, and in these cases a modified Lorenz osteotomy was performed followed by immobilisation in plaster-of-Paris from six to eight weeks. In one case only a fair functional result was obtained, but in 4 the result was very good. Fig. I. shows radiograms of one of these. The patient, aged 49 years, weighed 12 st.; she walked within three months of the operation and now walks with equal shoes and has no limp. There is three-quarters of an inch shortening; two-thirds of normal abduction of the hip; rotation is about half of normal; flexion is three-quarters of normal. She has no pain and can walk two miles easily and balances firmly on the injured leg.

(2) *Recent fractures low in the neck.*—In this series there were 6 cases. As is usual in fractures high in the neck, bony union was obtained in the cases treated. Two patients were not fit to stand active treatment. Of these one walks with support, the other died of myocardial degeneration, fibrillation, and exophthalmic goitre, all of which existed before the fracture.

(3) *Recent fractures high in the neck* (subcapital fracture).—Of 13 cases 4 were not considered suitable for treatment. This decision was arrived at only after consultation with physicians and anæsthetists. In such cases it is necessary to forego the chance of union in order to keep the patients alive. This does not mean that they must be condemned to lie in bed indefinitely. After a few days they can be induced to walk in a bucket-top calliper. Of the 4 patients considered unfit, 3 are walking with supports; 1 died some months after the fracture on account of septic absorption from a wound of the other leg. In 2 of the 9 remaining high cases there was impaction, and contrary to what has usually been advised, these fractures were not disimpacted; because they were in a sufficiently good position and the patients were aged 59 and 50 respectively. No anæsthetic was given, plaster-of-Paris was firmly applied, and immobilisation was continued for two and a half to

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three months. Bony union occurred satisfactorily (Fig. II.). Both patients are able to walk comparatively long distances, and movements are more than three-quarters of normal. It is perhaps of some interest that both these patients walked into the out-patient department. It is exactly this type of fracture which is missed and treated as rheumatism or as sciatica until non-union has commenced.

The remaining 7 fractures were subcapital and non-impacted. It is in these cases that the greatest difficulty lies. It is probable that bony union in any fracture depends upon four factors: apposition, immobilisation, blood-supply, and some chemical or hormonic influence. When the blood-supply of a fractured part is poor, immobilisation must be more accurate and more prolonged. It is therefore obvious that in subcapital fractures of the neck of the femur accurate apposition and prolonged immobilisation are of supreme importance. At the same time it is the duty of the surgeon to obtain his results in the simplest possible manner, and to remember that although union in a good position is desirable, the patient's life must not be unnecessarily endangered. The following method, which is a modification of Royal Whitman's method, will be found simple and effective.

Under general anæsthesia reduction is effected by flexing the knee, flexing the hip at a right angle, and putting the leg in slight adduction. Pressure is then applied in a forwards and downwards direction against the upper and back part of the trochanter. The fractures will be felt to crepitate and the femur will be felt to move downwards and inwards in relation to the pelvis (and therefore to the head of the femur). The leg is then extended, abducted, and internally rotated. If reduction has been effected the length will be equal to that of the other leg and internal rotation will be easy and the leg will remain internally rotated. A plaster-of-Paris spica is applied with the knee in slight flexion. The pelvis must be firmly gripped and the foot must be included. The degree of success probably depends upon the fixation which any individual operator can obtain with his plaster. Recumbency is enforced for two and a half months; the patient should then be encouraged to walk in the plaster, the foot having been released. If this is found impossible a walking calliper can be applied at the end of three and a half months. Since the leg is abducted, the other foot should be raised slightly when walking is started.

The following details give an idea of the duration of recumbency and the results of subcapital fractures.

CASE 1.—Aged 23 years. Walking three months after the fracture. Final result: no pain; bony union; no deformity; can walk any distance; rides a bicycle.

CASE 2.—Aged 67 years. Walking at the end of two and a half months. Bony union; no deformity; no pain. Movement three-quarters of normal. Suffers from extensive osteo-arthritis in both knees and in the other hip. Has attended Harrogate for years for rheumatism. Now can walk any distance in reason. Dances and plays golf.

CASE 3.—Aged 53 years. Walking in two and a half months. Bony union when examined one year after accident.

CASE 4 (Fig. III.).—Aged 58 years. Walking in three and a half months. Result: bony union; no shortening; wears high-heeled shoes; has slight pain. Can walk a mile and can stand on injured leg.

CASE 5 (Fig. IV.).—Aged 43 years. Walking in five months. A little pain. Has old-standing thrombosis. Can walk a mile easily. Can stand on injured leg; can go upstairs well; has no limp. Bony union when seen one year after accident.

CASE 6.—Aged 59 years. Walking in five months; timid; bony union; no deformity; no pain; no limp. Can walk easily for two or three miles. Did hill-climbing fifteen months after the accident. Can stand on injured leg.

CASE 7.—Aged 73 years. Walking six months after accident. Half normal movements of hip; half an inch of shortening; no pain; can get about freely. Bony union one year after accident.

In all the 13 recent fractures treated actively bony union took place in good position and with good function. There were no complications such as pneumonia or pressure sores.

RADIOGRAPHIC EVIDENCE OF LIVE BIRTH

BY MIRON HAJKIS, M.B. Oslo, L.M. Rotunda

(WITH ILLUSTRATIONS ON PLATE)

Sydney Smith [1] states that if a child has not breathed the stomach and intestines contain no air. My own findings agree with this statement. Using X rays I have been unable to demonstrate air in the stomach or intestine of stillborn children, even when a large quantity of meconium has been passed (Fig. I.). My observations also support Smith's view that the presence of air in the stomach and bowel is a useful confirmatory sign of respiration, especially in "cases where the lung has not been expanded either from weakness of the respiratory movement or from blocking of the respiratory passages. In such cases," he says, "air may still be swallowed, and from its presence in the stomach and bowel afford evidence of attempted respiration."

Breslau (quoted by Buchanan [2]) states that the presence of gas in the stomach and intestine is contemporaneous with respiration and independent of the ingestion of food. I have found X ray evidence of air in stomach and bowel in all of six infants with extensive atelectasis which were born alive and survived for periods from five minutes to eight hours. Indeed, in the new-born live child, which has not been fed by mouth, the stomach and intestines are often outlined radiographically as if they were filled with an opaque meal (Figs. II., III., and V.). In all the cases I made a post-mortem investigation immediately after radiography, and the findings corresponded with the X ray pictures in regard to the extent of atelectasis and presence of air in stomach and intestines as tested by the routine forensic methods. The radiographic examinations showed that atelectasis was most pronounced in the bases of the lungs, more in the left than the right lung, and that aeration was established in the margins (Taylor) or the right apex (Glaister). It may be suggested that in the cases illustrated the air in the bowel came from insufflation, but this can be disproved by referring to other cases in which this procedure was not resorted to (Figs. III. and V.). Further, I made experiments on stillborn infants immediately after birth to discover whether air can be made to enter the bowel by mouth-to-mouth insufflation, and I found that even by gross exaggeration of the clinical method I could inflate only the stomach. I agree, therefore, with Buchanan that air in the duodenum is strong evidence of live birth. Even when radiography was delayed until 24 or 48 hours after insufflation it was noted that air had not entered the duodenum (Fig. IV.) though the stomach showed slightly more distension. (The bodies had been kept in a mortuary at about 65° F.) Nor was I able artificially to inflate the lungs in these stillborn infants.

The penetration of air to the stomach and intestines

is due to the vital functions of swallowing and peristalsis, and its presence in the intestinal tract is very striking in the X ray pictures in contrast to the imperfect aeration of the lungs in cases of extensive atelectasis. Of the three essentials in the establishment of life—namely, the action of the heart, respiration, and deglutition and peristalsis—full respiration is the most difficult to establish fully. Respiration appears to be impossible without deglutition and peristalsis, and in the infant, as in the adult, asphyxia exaggerates peristalsis and so encourages the movement of any air that enters the intestinal tract.

In the course of my investigations I came across one embarrassing case (Fig. V.).

A radiogram of this child, said to be born dead, shows poor aeration of the lungs, the highest point of the diaphragm being in the seventh interspace. There is air in the stomach and intestine. The presentation was by the breech, and during delivery of the head by the Mauriceau-Smellie-Veit manœuvre the accoucheur felt the attempts at suckling with his finger; there was no crying. The explanation of this contrary finding is that the child was alive when the face was on the perineum, but did not survive the completion of the delivery. The body being born the respiratory movements could be performed. Needless to say such a case might present a problem in medico-legal practice. At autopsy no other cause of death could be discerned—certainly not intracranial hæmorrhage. The hydrostatic test demonstrated flotation of all parts of the lungs.

In this connexion I would like to mention a paper by Dennen,[3] and only offer my support for his opinion that radiography should be a routine in the diagnosis of morbid conditions of the newly born and especially of cyanosis. In Dennen's case X rays showed in a six-hour-old child almost complete atelectasis of the left lung, and only partial expansion of the right lung. Four days later there was normal expansion of both lungs and the child survived, whereas in my cases the atelectasis was much more extensive and resulted in death. In such cases X rays would be of value not only in diagnosis and appropriate treatment as Dennen insists, but also in prognosis by indicating the extent of the atelectasis.

As in my cases I could discern no cause of death apart from extensive atelectasis—and especially not intracranial hæmorrhage—I was forced to the conclusion that the persistent atelectasis, to use Taylor's expression,[4] was the cause of death. Glaister [5] states amongst the causes of death in the newly born atelectasis is probably the most common of the lung conditions.

From the medico-legal standpoint X rays provide invaluable means of obtaining information about the presence of air in stomach and intestines. My observations show that air is to be found there only when the child has breathed, and in my opinion radiography of the lungs and intestinal tract provides the best proof of live birth. The possibility that gas may be produced by putrefaction in lungs or intestine must be borne in mind; but the bubbles arising in this way would give an appearance different from that of air-filled alveoli or bowel which has been aerated by peristalsis.

Part of this work was done at the Rotunda Hospital, Dublin, by kind permission of Dr. Bethel Solomons, then the Master.

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Sund, Bergen, Norway.

RENAL DWARFISM ASSOCIATED WITH CALCIFICATION OF ARTERIES AND SKIN

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(WITH ILLUSTRATION ON PLATE)

Metastatic calcification occurring in chronic nephritis in adults, although extremely rare, has been known since Virchow first described five cases in 1855. But in chronic nephritis of childhood (renal dwarfism) an extensive search has revealed only two cases showing calcification of the arteries—viz., that of Smyth and Goldman[1]—in which five remarkably enlarged parathyroids were discovered at autopsy, and the case recorded by Karelitz and Kolomoyzeff,[2] in which large doses of viosterol had been given before the calcification was noted. The following case in which no vitamin D had been given and no enlarged parathyroids were found therefore seems worthy of record.

FIG. I.—Photograph of the patient.

A. B., aged 18, was sent to the skin department of the Sheffield Royal Infirmary on May 15th, 1933, on account of dry thickened skin with pigmented areas in axillæ and groins. As it was obvious that he was profoundly anæmic and extremely ill, he was transferred to the medical department. We there obtained a history that he had not been well and strong for many years, that he was always very thirsty, and passed a great deal of urine both by day and night. The thirst and polyuria had existed since he was a small child, and definitely before he had scarlet fever at the age of 6. There was no history of nephritis accompanying the latter illness. He appeared somewhat drowsy and mentally slow, but had reached Standard VII. when he left school at the age of 14. When 15 years old he began to work and developed knock-knee, for which an osteotomy was performed on the left leg. His appetite had been poor for many months, but he complained of no headache or vomiting. His height was 5 ft., his weight 4 st. 5 lb., and the accompanying photograph (Fig. I.) shows his undersized, rickety, and emaciated condition. His skin was dry, sallow, and pigmented, and in the areas noted was raised up into hard plaques. His lips were extremely pale and he had all the appearances of chronic nephritis in childhood. The heart was obviously enlarged, and the blood pressure was 155/100. There was no retinitis. The urine was very pale, specific gravity 1010 to 1012, albumin

1 to 2 g. per litre. Blood tests on admission to hospital on May 19th gave the following results:—

Hæmoglobin	30 per cent.
Red cells	1,500,000 per c.mm.
Colour-index	0·98
White cells	17,900 per c.mm.
Differential count	Normal.
Sedimentation-rate	Much increased
Wassermann reaction	Negative.
Non-protein-nitrogen	333 mg. per 100 c.cm.
Urea nitrogen	205 " " "
Cholesterol	179 " " "
Blood phosphorus	15·1 " " "
Serum calcium	6·7 " " "
Indican	Very strongly positive.

Radiogram of the spine, including the sacrum, showed remarkable erosion of bone. The limbs showed rickety changes with erosion, marked calcification of arteries (Fig. II. on Plate) and calcification of pigmented areas of the skin.

In hospital he became rather more drowsy and developed extreme dyspnœa. The non-protein-nitrogen rose to 400 mg. per 100 c.cm., and he died in coma without convulsions on May 28th.

At the post-mortem the kidneys (Fig. III.) were found to be extremely small, each weighing ¾ oz., and

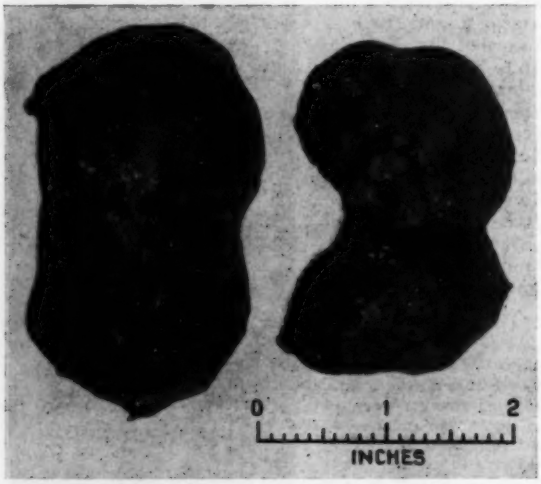

FIG III.—Photograph showing extremely contracted kidney.

were of a pale mottled colour. Microscopically, the most striking changes were a great degree of interstitial fibrosis, and dilatation of the tubules. Aggregations of lymphocytes were present. The glomeruli were few in number and showed varying degrees of endothelial proliferation and fibrosis. The vessels showed hypertrophy, chiefly of the media. There was no hypertrophy of the bladder or ureters. The heart weighed 9½ oz., and there was some hypertrophy of the left ventricle. The lungs were very œdematous, with a small left-sided pleural effusion. Calcification of the medium-sized and small arteries was found as shown in the radiogram, but the aorta was quite free. The spleen contained three old infarcts, and calcified vessels could be felt in the pulp. The other organs were normal. There was no enlargement of the parathyroids. Sections of the skin showed calcium deposits immediately beneath the epidermis.

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BILATERAL SPONTANEOUS PNEUMOTHORAX

WITH REPORT OF A CASE

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(WITH ILLUSTRATIONS ON PLATE)

A CASE of bilateral spontaneous pneumothorax is seen sufficiently rarely to merit description, and when it does arise it stimulates an interest in a subject which, because of its rarity, receives but scant consideration in the ordinary routine of a tuberculosis service. Spontaneous pneumothorax (unilateral) is fairly frequent but the bilateral form has not been described more than 50 times.

Bilateral cases may be divided into two types: (1) successive and (2) simultaneous. The first variety shows the pneumothorax now on one side and now on the other, but never together on both sides. Naturally the second variety, in which bilateral pneumothorax occurs simultaneously, is more likely to end fatally.

The ætiology of bilateral spontaneous pneumothorax is not definitely agreed upon. Among the causes may be mentioned: (*a*) rupture of tubercles on the surface of the lungs; (*b*) rupture of emphysematous bullæ; (*c*) an inherent fragility of the surface of the lungs; (*d*) fistulisation through the mediastinum between both pleural cavities; (*e*) a possible anatomical deformity in the development of the lungs, in which the human development has simulated that of some of the lower animals, where the pleural cavities are connected; and (*f*) some violent exertion—e.g., coughing, sneezing, physical strain, and, rarely, trauma.

According to McMahon,[1] who reviews what has been written on the subject, 58 per cent. of cases of bilateral spontaneous pneumothorax are associated with pulmonary tuberculosis. These are usually fatal. Another 16 per cent. are associated with emphysema. These also usually end fatally. A few cases are associated with secondary growths of carcinoma, and naturally are usually fatal. A few cases are associated with trauma, and here there is some tendency towards recovery.

McMahon's case was not due to pulmonary tuberculosis, either clinically or radiologically. Meyer[2-4] describes two cases associated with pulmonary tuberculosis, and one unusual case which followed coitus and ended fatally after the fourth occurrence. Fine[5] reports one in which the condition was possibly due to long-continued colds and asthmatic attacks, was definitely non-tuberculous, but ended fatally. Lamont[6] described a case which was non-tuberculous but occurred after very extreme exertion and resulted in recovery. Bedford and Joules[7] report one in which the spontaneous bilateral pneumothorax developed apparently without exertion, and came on during the night; there was no evidence of pulmonary tuberculosis, and the patient recovered. Bourne[8] records a case in an infant which died of miliary tuberculosis, Emerson[9] one due to asthma, and Mills[10] one arising after injury. Miller[11] describes bilateral spontaneous pneumothorax due to chronic tuberculosis with recovery.

CASE RECORD

The patient was referred to me by Dr. S. H. Waddy of Huddersfield, to whom I am indebted for a résumé of her previous history.

In May, 1923, she suffered from influenza, which was followed by anæmia and scanty menstruation. This condition steadily improved. In April, 1924, there was a period of tachycardia, cardiac irregularity, and dyspnœa, which was the result of a very severe cold. During the whole of 1924 the patient had periods of general malaise and cardiac irregularity. In October, 1927, she complained of palpitation, dyspepsia, a sinking feeling after food, and a dragging pain in the left lower abdomen. There was at this time dysmenorrhœa, but no physical signs in uterus or abdomen generally. During 1928 and 1929 there were occasional attacks of sickness and gastric discomfort, and sometimes a sensation of a "hollow feeling." In October, 1930, she complained of pain in the right shoulder, which improved very quickly. This was diagnosed as a rheumatic pain. In November, 1930, the heart action was still irregular, and the patient brought up a little blood on coughing. The sensations she had were of a dragging nature from the throat down to the abdomen, and were apparently nervous. In February, 1931, the patient brought up slightly pink phlegm, a specimen of which was found to be negative for tubercle bacilli. In January, 1932, there was pain in the left arm and shoulder, the cause being either rheumatism or possibly referred pain due to her cardiac irregularity. During this month she had attacks of pain in the chest, rather general, and sometimes located on the right side, the latter suggesting a tubercular pleurisy. In February, 1932, she had slight hæmoptysis and tachycardia.

The physical examination of the patient, whom I saw shortly after the last hæmoptysis, revealed remarkably few physical signs of disease in the chest. I suspected the right lung, which had fairly widespread granular breath sounds, but no definite crepitations. There was slight dullness to percussion over the right lung, but in the left lung the signs were practically normal. The heart sounds were also normal. The patient's general condition was very good, and she was well nourished; the sputum test was negative, and in consideration of the history of cardiac irregularity one might have been tempted to rule out pulmonary tuberculosis entirely. Radiological examination was definitely necessary and the first report I was able to make, on April 22nd, was as follows (Fig. I.):—*Right:* deep-seated disease, which gradually becomes thinner towards the lung surface; a spontaneous pneumothorax is present, shown along the whole of the outer surface of the lung, regular in outline; no fluid present in pleural space. *Left:* certain amount of haziness of lung tissue, with some peribronchial thickening; fine nodular disease present. Heart: slightly to the left.

In the light of the above report the re-perusal of the patient's history made me suspect that spontaneous pneumothorax had probably been taking place in this patient's chest off and on since October, 1930, when she complained of pain in the right shoulder. I did not suspect the possibility of the case being a bilateral one, and still considered that the pain she had felt in her left arm in January, 1932, was a referred pain due to her heart action. Having formed the opinion that the spontaneous pneumothorax on the right side was probably due to a valvular opening in the visceral pleura of the right lung, I took the pressure in the pleural space a few days after radiological examination and found that it was −7 −4. I inferred from this, and from the physical signs, that the lung was expanding again. I therefore repeated the radioscopy on May 3rd and was amazed to find that a complete spontaneous pneumothorax now existed on the left side. The spontaneous pneumothorax on the right side had disappeared (Fig. II.). At this point I may add that the patient complained of slight pain in her left shoulder, a certain degree of dyspnœa, and some palpitation, but this did not prevent her travelling several miles to attend the radiological centre

I now concluded that I had a case of spontaneous bilateral pneumothorax of the successive type, but I was not certain when she might become of the simultaneous type. I therefore recommended absolute rest in a sanatorium for at least four months, in the hope that some pleural adhesion might develop to anchor these mobile lungs. On June 15th the left lung had almost fully re-expanded though there was a small pneumothorax at the apex; but on August 30th the left pneumothorax had again increased (Fig. III.). At the end of four months in the sanatorium she was considered by the medical officer in charge to be well enough to be sent home, and certainly her condition generally was very satisfactory. The day after her return home, however, she developed acute dyspnœa and very great collapse, and shortly afterwards died, evidently having succumbed to simultaneous bilateral pneumothorax.

COMMENT

In this case of bilateral spontaneous pneumothorax due to pulmonary tuberculosis a fairly long period of absolute rest was evidently insufficient to stabilise the lungs in a natural way. One may, therefore, infer that the natural tendency for the production of pleural adhesions was either absent or very slight.

The almost inevitable development of simultaneous bilateral pneumothorax, especially in a case associated with pulmonary tuberculosis, suggests that an endeavour should be made to produce pleural adhesions artificially. The ideal aimed at in the performance of artificial pneumothorax—i.e., the non-development of pleural adhesions—is reversed when the case is one of spontaneous pneumothorax. Any interference directed to the production of pleural adhesions is not indicated, however, unless the patient's general condition, as in the present case, is satisfactory, and the radiological diagnosis warrants it. The adhesions might be produced by some form of cauterisation, or, possibly, by the injection of some irritant fluid into the pleural cavity.

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LYMPHOGRANULOMA INGUINALE ACQUIRED IN ENGLAND

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Reports of proved cases of lymphogranuloma inguinale acquired in this country are still rare. Cases purporting to be such have been recorded by McDonagh, by Hanschell, and by Gibson (1931); these were diagnosed on clinical grounds. Todd described a case which he claimed to be one of lymphogranuloma inguinale on the strength of the histological appearances of the excised glands.

The first case in which the diagnosis was confirmed by laboratory findings was described by Stannus and Findlay in February, 1933. Here Frei's test was negative, but as the patient was syphilitic this failure could be ascribed to "anergy." ("Anergy," described by Frei, is the condition where no response to antigen injection occurs, and may occur during the premenstrual period, in early syphilis, in tuberculosis, in septicæmia, and during prolonged pyrexia.) Later in 1933 Anwyl-Davies, King, and Findlay reported a case of lymphogranuloma inguinale, acquired in Limehouse, the pus from which produced characteristic changes on animal inoculation. Frei's test was not performed.

CASE-HISTORY

The present case is that of an unmarried man aged 24, a Cypriot, by occupation a scullion. Had lived in England for the past four years, without leaving the country.

Past history.—He had never had a previous inguinal bubo. Gonorrhœa three years ago. In 1931 a deep ragged painful ulcer, the size of a shilling, appeared on the prepuce. It was unaccompanied by inguinal swelling. Circumcision was performed and the ulcer was removed completely. Since Oct. 31st, 1933, the patient had been receiving treatment for gonorrhœa.

Present illness.—On or about Dec. 19th, 1933, the patient had coitus with an Englishwoman in Soho. On Jan. 2nd, 1934, three small lesions, resembling abrasions, appeared on the penis. Two of these were on the dorsal part of the shaft and one was just proximal to the frænum. No enlarged inguinal glands were then palpable. The urine was clear (2-hour specimen). Hypertonic saline was applied to the lesions. On Jan. 9th all the lesions had increased in size (to the diameter of about 5 mm.). They were painless, non-indurated, and very superficial, the surfaces exuding a little clear serum, and the margins were regular and level with the surrounding skin. Dark-ground examination of a scraping showed no *Treponema pallidum*. The Wassermann reaction was negative. Urine clear. On Feb. 23rd the patient displayed a swelling in the left groin of one day's duration. It was an enlarged gland of supero-internal group, inguinal chain. It was painless and non-adherent to skin or deep structures. The Wassermann reaction was negative. Urine showed a few flakes. On Feb. 26th the bubo had increased in size and several adjoining glands were involved. The penile lesions were of the same size and were exuding a slightly blood-stained serum which was negative on dark-ground examination. The urine was clear.

On admission (March 2nd, 1934).—The patient was a well-built subject, of swarthy complexion. Scabies distributed over body, especially inter-digital clefts. Tongue coated, tonsils normal. No conjunctivitis. Nothing abnormal in alimentary, cardiovascular, pulmonary, or central nervous systems. The spleen was enlarged to 2 cm. below the costal margin. The liver was not enlarged. The penile lesions were unaltered. The bubo was the size of a pigeon's egg, the long axis lying parallel to and above Poupart's ligament. The overlying skin was pink and adherent to it. Pain was felt on deep palpation. No enlargement of external iliac or any other lymph glands. The right prostatic lobes and right seminal vesicle were enlarged and hard, but not tender. The urine was clear. Dark-ground examination of purulent serum, withdrawn by puncture through healthy skin, was negative.

Treatment and progress.—March 3rd: scarlet red ointment was applied to the penile lesions, anti-scabies treatment instituted. March 4th: along the needle-track a slightly indurated "cord" was felt, and at the site of skin-puncture a small inflamed area (diameter 5 mm.), resembling a positive Frei's test, was seen. March 5th: the sores were enlarged; the bubo was increasing in size and the overlying skin was violet in colour; adjoining glands of the supero-external group were enlarged. Weak eusol was applied to the penile lesions. March 7th: the bubo was still larger, and at one area fluctuation could be elicited; aspiration yielded only blood; the patient complained of headache and pain in the thoracic vertebræ. A provocative injection of 0·45 g. of novarsenobenzol was given and Frei's antigen was injected intracutaneously (right arm). March 9th: Frei's test was positive; the saline control negative; the patient complained of slight myalgia in the right upper arm. The Ito-Reenstierna test, using Dmelcos vaccine, was performed on left side; myalgia of the left upper arm followed this. T.A.B. vaccine (62·5 millions) was given intravenously. This resulted in a rigor and a subsequent rise of temperature to 102·2° F. There were no constitutional disturbances. March 11th: the bubo was definitely smaller, its overlying skin now having the colour of a bruise. Epithelialisation of the penile lesions was proceeding. The Ito-Reenstierna test was weakly positive. March 12th: T.A.B. vaccine (125 millions) was given, resulting in rigor, rise of temperature to 102·6° F., and subsequent temporal headache and pains in both shoulder-joints and the thoracic vertebræ. March 14th: Wassermann reaction negative. March 15th: T.A.B. vaccine (250 millions) was given, producing rigor and rise of temperature to 100·6° F. There were no constitutional disturbances. The bubo was decreasing in size and the penile lesions healed.

On March 17th the bubo was small (size of filbert), hard, and painless to firm palpation; the spleen was not palpable. Enlargement and hardness of the right prostatic lobe could still be detected, but the right seminal vesicle was normal in size and consistency. On March 19th the patient was discharged, fit for work.

DISCUSSION

Hanschell has observed that the disease favours those who work in hot atmospheres. The man described above spent most of the day in a hot stuffy basement "kitchen." The subject described by Stannus and Findlay [5] was a waiter.

Up to the present, primary genital lesions of the male have only been reported as occurring on the glans penis, coronary sulcus, internal surface of the frænum, or urinary meatus. Since extragenital lesions have been described (by Hellerström 1928, and by Buscke and Vasarhelyi) it is not inconceivable that coital abrasions of the penile shaft should be portals of entry. The persistence of the primary sores was, in this case, undoubtedly due to repeated applications of hypertonic saline and scraping. Adenitis, occurring 65 days after coitus, was typical of lymphogranuloma inguinale and corresponded to group two of Cassone's classification. "Adénite violette" has been observed by Phylactos, and I have shown that the condition appears to be more prevalent in pigmented subjects. Enlargement of the spleen in this disease has been observed by Naumann, Gay-Prieto, Giacardy, Ravaut, Boulin, and Rabeau, and Buscke, Boas, and Vasarhelyi. Prostatic and seminal vesicular enlargement has been seen by Gibson (1932) and by myself. Myalgia and arthralgia occurred in cases described by Erber and by Löhe and Blummers.

The specificity of the antigen used for Frei's test was controlled by intracutaneous injection into a female syphilitic, when a negative reaction resulted. The antigen itself was prepared (on Nov. 3rd, 1932) from a "climatic bubo" occurring in an Indian. It gave a positive Frei reaction with a case of climatic bubo in a European. It is noteworthy that the antigen remained potent after storage in the ice-chest for 15 months.

A Ducrey infection, three years previously, was, in my opinion, responsible for the weak positive Ito-Reenstierna reaction. The lesion then described would appear to be ulcus molle. Reenstierna has shown that skin reactions can occur four years after ulcus molle, and that soft sores, unaccompanied by bubo-formation, can produce a subsequent Ito-Reenstierna reaction.

The treatment, from the commencement of T.A.B. injections, occupied ten days. This length of time is much shorter than that taken by other therapeutic measures (e.g., operation, injections of antimony, arsenic). It was enhanced by the fact that no local treatment of the bubo, such as poulticing or incision, was attempted. Excellent results from T.A.B. therapy have been reported by Hanschell, Gracey, and Low and Cooke.

SUMMARY

(1) Lymphogranuloma inguinale appears to be definitely established in England. (2) Diagnosis, where practicable, should be confirmed by Frei's test. (3) Concurrent infections (e.g., syphilis, ulcus molle) should be repeatedly sought for. (4) Local treatment of the bubo should be avoided. (5) Prompt treatment by T.A.B. injections usually produces a rapid cure.

My thanks are due to Mr. R. Lester Williams, F.R.C.S., for permission to publish this case, and to

Dr. N. Hamilton Fairley and Mr. R. J. Bromfield, of the Hospital for Tropical Diseases, for supplying me with Frei's antigen.

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THE IMPEDANCE ANGLE OF THE HUMAN BODY

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THE following is an account of a preliminary investigation of the Brazier method of determining an electrical property of the human body, the impedance angle. The definitions of terms here used are to be found in Brazier's original papers,[1-3] which we have adhered to throughout.

Brazier's chief claims may be summarised as follows: (1) There is a marked sex difference in the value of the impedance angle, it being higher in women than men. (2) The impedance angle is increased in cases of thyrotoxicosis. (3) In cases of thyrotoxicosis, partial thyroidectomy is followed by parallel changes in the impedance angle on the one hand and the basal metabolic rate and the weight curve on the other. (4) Although the basal metabolic rate (B.M.R.) is raised by such drugs as ephedrine, pilocarpine, thyroid extract, and thyroxin, only the last two cause an increase in the impedance angle. It is therefore concluded that change in the impedance angle is specific to a thyroid factor.

TABLE I

—	Our figures.		Dr. Brazier's figures.	
	ϕ	S.D.	ϕ	S.D.
Men (59 cases) ..	0·131	0·010	0·139	0·013
Women ..	0·099	0·012	0·111	0·010

ϕ = phase angle = $\frac{\pi}{2}$ − impedance angle.
S.D. = standard deviation.

Our experiments have been confined to the first two of Brazier's claims. As will be seen the results fully confirm her findings. These measurements were made with a simplified modification of Brazier's apparatus assembled from standard laboratory components.

From the results set out in Table I. it will be seen that there is some discrepancy between the mean values for males and females as measured by Brazier and ourselves. Discussion with Dr. Brazier on this point has convinced us that the differences may be accounted for by the incomplete balancing out of stray electrical capacities in our apparatus. This defect does not vitiate the general conclusions to be drawn from the results. Table II. shows the results obtained from cases of thyrotoxicosis. These have been arbitrarily divided into two groups. (1) Cases of fairly recent onset with marked symptoms, which have had no medical or surgical treatment. (2) Cases operated on; medically treated cases and cases of long duration. The deviation of the impedance angle from the normal mean is much more marked in the first than in the second group.

TABLE II.—*Thyrotoxicosis*

Sex and age.	Severe ϕ	Age.	Mild ϕ	Sex and age.	Severe ϕ	Age.	Mild ϕ
F. 36	0·075	39	0·075	F. 29	0·075	30	0·088
F. 36	0·069	55	0·075	F. 31	0·075	67	0·082
F. 37	0·082	18	0·069	F. 23	0·051	63	0·088
F. 34	0·063	34	0·082	F. 20	0·060	45	0·080
F. 34	0·069	45	0·078	F. 17	0·057	46	0·101
F. 54	0·053	49	0·093				
F. 34	0·058	21	0·085	Mean	0·069	..	0·0898
F. 24	0·075	50	0·105				
F. 46	0·086	37	0·082	M. 50	0·085	..	..
F. 27	0·073	36	0·088	M. 50	0·095	..	..

It is unfortunate that at the time of this investigation no apparatus was available for measuring the B.M.R., but as this has now been remedied we hope to be able in the future to make parallel determinations between impedance angle and B.M.R.

Our thanks are due to Dr. Brazier and Mr. Gall for advice and to Messrs. Tinsley and Co. for the loan of the experimental apparatus.

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MANCHESTER ROYAL INFIRMARY: ANNUAL REPORT. The report for 1933 lays especial emphasis upon the need for a private patients' home—at present there are no private wards whatever. The building and furnishing of such a home will cost £95,000, and between November, when an appeal for that sum was made, and the end of the year £17,000 was subscribed. The proposed building would contain 100 beds, mainly in single rooms, and, since it is anticipated that they would be fully used, it is calculated that approximately 1500 patients would be admitted in a year. In 1933 there were 11,928 in-patients, a relatively small increase, and 17,997 out-patients, a small decrease. The year's deficit on general account was £17,707, more than double that of the preceding year, notwithstanding that free legacies, totalling £31,589, were brought into account. It is explained that "the increased ordinary expenditure is due largely to professional requirements—both medical and nursing—and these could not be curtailed without impairing the efficiency of the hospital."

MEDICAL SOCIETIES

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

AT a meeting of this association held at B.M.A. House on June 26th, with Prof. MARY LUCAS KEENE in the chair, Dr. LETITIA FAIRFIELD spoke on

Eugenic Sterilisation of the Unfit

Dr. Fairfield based her observations on the recent report of the Departmental Committee on Sterilisation (the Brock Report [1]). She pointed out that the wide popular interest in sterilisation had grown out of two main factors. First, the increase in biological knowledge of the hereditary factor in mental and physical disease; and, secondly, the sociological outlook which attributed numerous evils of society to mental and physical "unfitness." The appointment of the committee was inevitable, for it had become fashionable to regard sterilisation as a panacea, and in the case of mental deficiency, for example, the overemphasis on sterilisation had been allowed to swamp every other aspect of a many-sided problem. It was only fair to state that the efforts of many prominent eugenists and the findings of the Departmental Committee's Report were directed towards correcting these exaggerated claims. Dr. Fairfield then reviewed the findings of the report. She considered that the legal obstacles in the way of the eugenic sterilisation of persons of normal mentality had been somewhat exaggerated. As a matter of fact no one who was able to pay for such an operation at the present day had the least difficulty in getting it done and probably more hospitals were performing such operations than was supposed. No case of a surgeon suffering any penalty for doing a eugenic sterilisation was on record and it was impossible to imagine such a case being brought into court, provided that genuine grounds existed for believing that diseased offspring might be procreated. It was recognised, however, that the sterilisation of mental defectives is undoubtedly illegal.

In examining the present knowledge of the causation of mental defect the committee had evidently, Dr. Fairfield said, found itself on highly contentious ground. All their witnesses agreed on the important part played by "heredity" but they were not at one on the exact meaning of the term. Some would include in the family tree any deviation from the normal, including epilepsy, instability, delinquency, insanity, while others would confine the term to the transmission of a single defect such as certifiable mental deficiency. Naturally the percentage of "hereditary" cases differed according to the view taken, the variation extending from 5 per cent. to 80 per cent. The report had recorded some interesting researches into the mentality of the offspring of defectives, who showed an unexpectedly high rate of mental deficiency—i.e., nearly one-third of surviving children. She pointed out, however, that the figures were overweighted, as defective offspring were likely to call the attention of the authorities to defective parents. The report further blackened the picture by bracketing the "subnormal" and defective children, although the former might be little different from the general population. While assessing the part played by environment in causing mental abnormality many witnesses stressed the point that this factor acts in combination with defects of heredity, the thesis being: "Environmental factors may accentuate inherited weakness." The evidence also brought out a point which is still often overlooked —i.e., that mental deficiency is so devious in its manifestations that it cannot conceivably be a single unit transmissible in Mendelian lines, though certain subvarieties may be.

The final recommendations of the committee condemned compulsory sterilisation as unjustifiable in the present state of knowledge of genetics and likely to arouse public hostility. It was not clear, however, whether it would be possible to keep voluntary sterilisation really voluntary. It is difficult to imagine the precautions which would prevent enthusiastic committees from using the social services (such as outdoor relief), or the bait of discharge from an institution as an inducement to sterilisation. This was avowedly happening in other countries where sterilisation measures were on the statute book. As regards high-grade mental defectives, the committee evidently considered it an easy matter for a doctor to decide whether they were or were not mentally competent to give a valid consent to the operation, but no standards were laid down and Dr. Fairfield considered that in practice the point would be a very difficult one to determine. As regards mentally normal persons it seemed to have been overlooked that any attempt to regulate voluntary eugenic sterilisation would seriously restrict the freedom of action now enjoyed by the "well-to-do" —i.e., by all who could afford to pay for an operation. In future they would have to submit to an elaborate process beginning with two medical certificates, and involving reference to the Ministry of Health and possibly to the Board of Control or a special advisory committee of experts. Notoriously in the sight of a ministry a thousand years was but as a day, and the loving couple who longed to be united could hardly be expected to await inevitable official delays. It seemed probable that the regulation of voluntary sterilisation was doomed to failure. In view of the small proportion of institution cases who would be suitable for sterilisation, and the grave risks involved by any form of legislation on the subject, it seemed doubtful whether the recommendations of the report should receive general support.

Dr. C. P. BLACKER (general secretary of the Eugenics Society) said he found himself in entire agreement with most of the points which Dr. Fairfield had made. The propaganda in favour of legalising eugenic sterilisation would, he said, do more harm than good if it were seized upon by local authorities as a justification for inertia or if it were interpreted by the general public as a measure likely to save the pocket of the ratepayers. Much confusion also centred around the meaning of the word "heredity." According to the report of the committee on mental deficiency appointed by the British Medical Association, the term "heredity" implied "that in the ancestry of any given case of mental deficiency there has existed a morbid condition of bodily and/or mental development, which may have taken the form either of mental deficiency or of some neuropathic condition, or of some other defect due to damage inflicted to one or other of the germ cells before fertilisation." According to this sweeping definition we would be justified in regarding as hereditary a given case of mental defectiveness if it were known that there had occurred in the ancestry of that defective a case of cleft palate in the time of William the Conqueror. Careful scrutiny of recent American

[1] Vide THE LANCET, Jan. 27th, 1934, for a summary of the recommendations of this report; these were later discussed in a series of articles beginning on May 12th entitled "Eugenics in Practice."

and continental investigations into the heredity of mental deficiency pointed to the conclusion that the more carefully the pedigree was investigated the greater was the importance attributed to heredity as a causal factor and the larger was found to be the percentage of parents of high-grade defectives who were themselves on the borderline between subnormality and certifiable defectiveness. At the same time, it should be remembered that, though discussions on sterilisation continued to focus themselves upon mental deficiency, the recommendations of the Brock Report extended far beyond this sphere. The eugenic benefits, in fact, of legalising the voluntary sterilisation of mental defectives would probably turn out to be small as compared with the results of legalising it for persons who had recovered from mental disorder and for persons who exhibited or carried mental or physical disease or defect. The results, said Dr. Blacker, of the uncertainty in regard to the present state of the law regarding the sterilisation of persons who are compos mentis had at present the effect of discriminating against the poor. The legal risk, admittedly small, was willingly taken by surgeons who operated, in a private capacity, upon paying patients; the same surgeon, however, before operating upon a hospital patient usually found it necessary to obtain the consent of the superintendent of the hospital. This consent was often withheld, partly for fear of alienating Roman Catholic subscribers to the hospital and partly because, in view of the already long waiting-list, many hospitals hesitated to incur the smallest legal risk. Such discrimination between rich and poor was unfair, and it constituted a good argument for regularising the position for people of all classes by Act of Parliament. In the matter of safeguards, said Dr. Blacker, a course had to be steered between two opposing camps of critics, and, in his opinion, the recommendations of the Brock Committee constituted a happy via media. Some safeguards, he thought, were necessary. It was to be remembered that vasectomy was a simple operation, capable of being performed under a local anæsthetic; it took but a few minutes and necessitated at most a day's absence from work, yet it produced irreparable and irreversible effects. Every new law was exposed to certain criticisms and objections. Dr. Blacker was far from denying that a voluntary sterilisation law along the lines of the recommendations of the Brock Committee was exempt from these, but in deciding whether to oppose or to support it, the question we had to ask ourselves was: on balance did the advantages outweigh the disadvantages, and he believed that in this instance the answer was yes.

REVIEWS AND NOTICES OF BOOKS

Elements of Experimental Embryology

By JULIAN S. HUXLEY, M.A., Hon. Lecturer in Experimental Zoology at King's College; and G. R. DE BEER, M.A., D.Sc., Fellow of Merton College and Jenkinson Lecturer in Embryology, Oxford. London: Cambridge University Press. 1934. Pp. 514. 25*s*.

THIS member of the Cambridge Comparative Physiology series is an excellent book, in which the authors have set themselves to give a connected account of "prefunctional" development in the light of experimental results. The field of research here is enormous, and we imagine that, among the facts presented and the provisional principles based upon them, there will be something new for everybody, and much that is unknown to many. The authors, faced with the mass of material, were compelled to put limits to their activities, and this book is essentially concerned with the biological problem of differentiation. Epigenesis, of course, describes the process, but something of preformation (but not in the old sense) is demanded by the fact at least of specific development. Gradients are brought in to account for the determination of the embryo from an undifferentiated egg. We confess that we have never been able to convince ourselves that the axial and other gradients of C. M. Child possess a value beyond that of descriptive terms, but there can be no objection to their use in a formal provisional theory to provide for the possibility of the change. The consideration of polarity, symmetry and asymmetry, cleavage, and differentiation is full and satisfactory. A long and detailed account of gradients and gradient fields is followed by a very interesting chapter on the differentiation of the amphibian nervous system, and this by one on hereditary factors and differentiation. Two more chapters and an appendix complete the text, and there is a good bibliography.

The authors disclaim categorically any desire to enter on philosophical discussions, and are evidently of opinion that physics and chemistry hold the secrets of biology between them. We may not view the organism in the same way, but that does not keep us from admiring this work. The task of presenting and classifying a heterogeneous mass of facts, and of establishing the various components of development, has been carried out in a masterly way. With the exception of Morgan's work on experimental embryology we do not know of any book in the English language in which the vast amount of fact and detail has been presented to the reader in such reasoned order and sequence. The volume ought to be within reach of every worker in biology.

Diabetes Mellitus

Diagnosis and Treatment. Fifth edition. By O. LEYTON, M.D., D.Sc., F.R.C.P., Physician to the London Hospital. London: Adlard and Son, Ltd. 1934. Pp. 144. 6*s*. 6*d*.

THE fifth edition of this book incorporates a good deal of new work. Nearly a quarter of the space is devoted to the diagnosis of diabetes mellitus. In most cases this is easy, but it may be very difficult. Dr. Leyton describes five methods of determining it: (1) sugar-tolerance test; (2) progressive diet test; (3) effect of pancreatic rest; (4) intravenous injections of glucose; (5) effect of toxins on pancreatic efficiency. The sugar-tolerance test is the one most used, and it is, as a rule, easy to interpret. It may give doubtful or even misleading results, and Dr. Leyton explains how these can be avoided. The progressive diet test is very valuable as it will often differentiate between doubtful sugar-tolerance curves. The observations can be completed in ten days at the most by Dr. Leyton's method; four days is considered sufficient by many workers. In some cases it is advisable to treat the patient with a diet which will rest the pancreas, and to repeat the sugar-tolerance test and progressive diet test at intervals of three to six months. The other two methods mentioned—

i.e., the effect of toxins on pancreatic efficiency and the intravenous injections of glucose—have not been much used. Dr. Leyton believes that "diabetes mellitus is congenital in the same way as tuberculosis is congenital." He says: "Some members of some families possess pancreatic cells which are exceptionally susceptible to some poison, probably, but not necessarily produced by bacteria or virus." He does not mention the possibility, which Houssay's work suggests, that the disease is due to an over-action of the anterior lobe of the pituitary, and that the Beta cells are not themselves diseased. The short section devoted to danger of infection and anæsthetics is clear and most useful.

The principles of treatment are well set out and are based on Allen's original observation that "a rested pancreas may regenerate." Dr. Leyton therefore aims at keeping the blood-sugar below 0·15 g. per cent.; he does not explain why he adopts this figure, which is less than that of most normal people after a meal—i.e., 0·18 g. per cent. in the capillary blood. He allows the patient as much carbohydrate as he chooses, but divides it up between the meals according to whether one, two, or three doses of insulin are given daily. The description of the symptoms of hypoglycæmia is very good, and the differential diagnosis between coma due to hyper- and hypoglycæmia is excellent. The book is essentially a small monograph, and contains many original observations. Some of the statements are provocative and the book is not always easy to read, but all workers on the subject will find valuable help as well as stimulation in its pages.

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1. La transfusion du sang de cadavre a l'homme

By SERGE JUDINE. Preface du Prof. A. GOSSET. Paris: Masson et Cie. Pp. 145. Fr.24.

2. Problèmes théoriques et pratiques de la transfusion sanguine

By ARNAULT TZANCK, Medécin des hôpitaux de Paris. Same publishers. Pp. 212. Fr.35.

1. Dr. Judine's book deals with a branch of blood transfusion which is wholly novel. Hitherto, in all countries blood has invariably been obtained from living donors. Dr. Judine, working in Moscow, was unable, for reasons that are obscure, to find any living donors and conceived the idea of obtaining blood from corpses. It seems improbable that, even in Moscow, the recently dead are more numerous than the still living, but, at any rate, the supply of corpses included a sufficient number of those dead by suicide, accident, or heart failure to render profitable an investigation of the possibilities. In the course of an extensive experimental and practical study many interesting points have emerged. Thus it was essential to discover whether the oxygen-carrying function of the blood of corpses was unimpaired and, if so, for how long. It was found that corpse blood produced the same degree of oxygenation in the recipient as living blood, and that a corpse could be used successfully for as long as eight to ten hours after death. For this length of time no clotting of blood took place, and the blood was not found to be toxic. The mode of death was found to influence the amount of blood obtained, for whereas 1½ to 2½ litres could be extracted from an intact corpse, less than half this amount could be got from one that had died by violent trauma. The really useful corpses, in fact, were those that had died from suicide or heart failure. The blood is obtained from the internal jugular vein with the body in the extreme Trendelenburg position. It is citrated and kept in the ice-chest until wanted and has been used after as long a period as 16 days; but it is not usually kept more than ten days. The use of corpse blood demands the same precautions and safeguards as that of living blood, and the indications are the same. The novelty of Dr. Judine's work lies in his study of corpse technique; and from our point of view it is only of academic interest, for it seems improbable that in this country it will ever be necessary to fall back, so to speak, on corpses.

2. Numerous monographs on the subject of blood transfusion have been published in recent years, and it is no longer easy to find anything to communicate that has the attraction of novelty. It is useful, however, to have summaries of the accumulated experience of specialists and Dr. Tzanck is master of his theme. The work is arranged in ten "leçons," which deal with the usual aspects of the subject, with the addition of some less usual ones, such as "difficult transfusions" with a few pages on "difficult veins," and the organisation of urgent transfusions. Here and there are found references to historical matters, but it is disappointing to find that the historical range is never permitted to extend outside France. And, indeed, this parochialism is characteristic of the whole book, so that it is difficult to discover whether the author has ever heard of any writers who have lived outside France other than William Harvey and Almroth Wright. The "bibliography" is in the same vein, including only the writings of the author and his associates. The book concludes with a series of 28 aphorisms on blood transfusion. Many of the opinions there expressed are in close agreement with those of earlier (non-Gallic) authorities, but Dr. Tzanck has presumably arrived at them all by the laborious process of personal research and observation.

Mechanism of Nervous Action

By E. D. ADRIAN, M.D., F.R.S., F.R.C.P. London: Humphrey Milford, Oxford University Press. Pp. 103. 10*s.* 6*d.*

THIS slender volume embodies the Johnson Foundation Lectures delivered by its distinguished author at the University of Pennsylvania in 1932. A brief yet informative sketch of the development of electrophysiology is given by way of introduction, after which Prof. Adrian plunges in medias res by discussing in his lucid manner the activity of single nerve-fibres and the nature of the nervous messages. He shows that changes in electric potential constitute a true index to what occurs when nerve-fibres are in action, and that impulses set up by electric stimulation of motor nerves are in point of fact identical with those arising from sense-organs or nerve-cells. Waves follow each other quickly or slowly, that is, are graded, and apparently no other kind of transmission can occur. Under natural circumstances, the effective mechanical stimulus that activates sense-organs is one of stretching the terminal part of the sensory nerve-fibre; the receptors discharge their impulses at so many a second—mostly at or above 20 a second, but also at lower rates. Here the application of his work to clinical neurology becomes evident; Prof. Adrian shows that variations in excitability and adaptation-rate exist, also in rate of conduction. He finds that different sensory fibres exercise different specific effects, though this is probably not so for

pain. Non-myelinated fibres with slow conduction have endings which respond only to noxious stimuli, whereas rapidly conducting fibres are tactile only; but intermediate medullated fibres may give either a sense of contact or of pain according to the magnitude of the discharge. Prof. Adrian has not been convinced that varying sizes of sensory fibre correspond to muscle sense, touch, and temperature conveyance. His tentative conclusion is to the effect that both quality and intensity of sensation may depend, so far as concerns certain fibres, on changes in the discharge-rate.

Neurology

By ROY R. GRINKER, Associate Professor of Neurology, the University of Chicago. London: Baillière, Tindall and Cox. 1934. Pp. 979. 38*s*.

Dr. R. R. Grinker has written a long and compendious treatise on neurology—using the term in its widest sense, for a considerable portion of the book is taken up with anatomical and physiological matter; contrasted with this, the space allotted to neuropathology is less adequate. So far as is made clear, the plan adopted by the author is to take some part of his subject—e.g., the cerebral cortex—and after discussion of its anatomico-physiological features to describe its disorders. This scheme, however, seems to have been modified so often that the reader is sometimes left rather bewildered; thus apraxia is briefly examined in connexion with the corpus callosum, nothing being said of its parietal significance. Aphasia is dealt with at the end of the chapter on the cerebral cortex; Dr. Grinker follows the conceptions and terminology of Sir Henry Head closely—and somewhat uncritically. Other parts of the same chapter discuss the symptomatology of disease of the several lobes of the brain, with the aid, in places, of large quotations from other writers—sometimes amounting to more than a page. Reference is made to anatomical niceties which are meaningless without a diagram—e.g., "Area 8 α β γ lies in the posterior part," &c., area 6a α is repeatedly mentioned but not defined except as "the greater part of the surface of the precentral area," and so on. Another peculiarity of arrangement is that to Motor Unit, Cerebellum, Muscle Tone and Posture, and Extrapyramidal Motor System, separate chapters are assigned, though the subjects are intimately interrelated; again, Spinal Tumours are placed between the sections on Spinal Nerves and the Vegetative Nervous System, Intracranial Tumours between the Cerebral Cortex and the Anatomy and Physiology of the Blood-supply to the Central Nervous System. The whole construction of the work thus leaves something to be desired.

On the clinical side the descriptions of different nervous affections are curiously unequal, and the internal arrangement of the material is often involved. For instance, the therapy of disseminated sclerosis is described before its differential diagnosis—incidentally, of the former we are told that "rest in bed and hope for spontaneous remissions are all that can be done" (sic). The account supplied of syphilitic amyotrophy (under the hybrid title of "amyotrophic meningomyelitis luetica") is too sketchy to be of value and conveys a misleading idea of its nature. A paragraph on the course of epilepsy is wedged in between descriptions of epilepsia partialis continua and of serial attacks.

The style of writing is unattractive. The reader is every now and again pulled up by a horrid blend of phraseology which is neither English nor any other language—e.g., "axis cylinder destruction with 'Abbau' attempts by microglia"; "the so-called 'anfalls paralyse' or epileptiform general paresis"; "there is a type of myelitis called *neuromyelite optique aigue*"; "Edinger's famous 'Ausbrauch's' theory may be mentioned," &c. If German or French terms are introduced they should be given in correct French or German, not a bastard variety. On p. 739 "Huebner's endarteritis" and "Heubner's endarteritis" are repeated turn about. Other errors of a grosser kind might be exemplified. But the book contains many good illustrations and diagrams, and at the ends of the chapters are useful lists of bibliographical references.

Abscess of the Brain

Its Pathology, Diagnosis and Treatment. By E. MILES ATKINSON, M.B., B.S. Lond., F.R.C.S. Eng., Surgeon in charge of the Ear and Throat Department, Royal United Hospital, Bath; Consulting Aural Surgeon to the Trowbridge, Chippenham and Malmesbury Hospitals. London: Medical Publications Ltd. 1934. Pp. 289. 21*s*.

THIS work is an expansion of the Jacksonian prize essay submitted in 1926. It is based upon the study of a series of 23 of the author's own cases of brain abscess supplemented by eight additional cases illustrating kindred pathological affections of the brain and meninges. A fairly comprehensive outline is given of the pathological and clinical aspects of this condition. Inasmuch, however, as the author's own experience, as shown by the protocols of cases at the end of the book, is limited to the otogenic class of brain abscess, it has been necessary to draw extensively upon the published work of other investigators. The present state of our knowledge is adequately summarised. The discussion on treatment reveals something in the nature of a dilemma. The mortality-rates are notoriously high in all published series of brain abscess except that of Macewen, who achieved 18 recoveries in a series of 25 cases. This exceptional result appears to have excited an inferiority complex in his successors. Yet it is difficult to believe, in the face of so many acknowledged improvements in neurosurgical technique, that the modern surgeon is defeated purely on questions of technique. Mr. Atkinson ascribes a large measure of Macewen's success to the fact that his cases were selected: they were all of the chronic variety in which the abscess is walled off by a firm fibrous capsule. It might therefore be inferred that the correct policy in treating a brain abscess is to wait until the optimum moment for operation has arrived. This, however, would certainly result in the loss of many acute cases. Energetic surgical measures at an early stage seem therefore to be necessary, but when once drainage has been established Mr. Atkinson suggests that the surgeon should refrain from "meddling tactics." He is in favour of a double drainage-tube, one element of which should be large and have firm walls and the other smaller. It is then possible to dress the abscess cavity by gentle irrigation with hypertonic saline. Using such methods he has lowered the mortality-rate in his series to 55 per cent., a figure which compares very favourably with those from other sources.

By the avoidance of repetition and exhortation the work might have been considerably reduced in bulk without loss of clarity. Many of the illustrations would have gained by being enlarged so that they occupied the plates more fully; this is particularly true, perhaps, of the coloured drawings of histological preparations made by the late Mr. J. R. Ford. In all other respects the book is pleasantly produced.

Men and their Motives

By J. C. FLUGEL, Assistant Professor of Psychology, University College. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1934. Pp. 289. 10s. 6d.

THIS book is a collection of eight miscellaneous essays of which seven have previously appeared in various psychological journals. Two essays, entitled On the Significance of Names, and Some Psychological Aspects of a Foxhunting Rite, are written by Ingeborg Flugel. The two most important chapters deal with the relation of sexual and social sentiments and with the international language movement. The first opens with a comparison of the views of McDougall, who holds that the sexual and social instincts are separate, with those of Freud who regards them as ultimately identical. The author introduces the useful words homosocial and heterosocial to denote the social relations which exist between members of the same sex and of opposite sexes respectively. He notes that male homosociality is usually more developed than female, for which various causes are assigned; that the "sociality" of women is increasing, that the institution of the family may be antagonistic to that diffusion of interest which is demanded by social sentiments, and that "romantic" sexual love aids rather than impedes the formation of social sentiments. This relation points to an essential identity of sexual and social instincts, which validates the theoretical outlook of Freud rather than that of McDougall.

The essay on the international language movement seeks to interpret, in psycho-analytic terms, the unconscious emotional factors which affect the acceptance of the movement.

All the essays in the book take the form of psycho-analytic interpretations. The psychology of birth control, Maurice Bedel's Jerome (a very interesting critical study), and the character and married life of Henry VIII. are treated along these lines. Prof. Flugel writes throughout from the standpoint of an orthodox Freudian; but his essays have one inestimable advantage over those which too frequently emanate from his Freudian colleagues—they are clearly, carefully, and lucidly written. He never fails to make his meaning perfectly clear, and no sentence need be read more than once.

Studies in Blood Formation

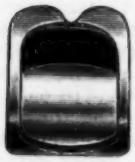
By T. D. POWER, M.D., M.R.C.P., D.P.H., D.P.M., Deputy Medical Superintendent, Brentwood Mental Hospital. London: J. and A. Churchill. 1934. Pp. 124. 8s. 6d.

Dr. T. D. Power has collected into a small volume the results of his study of hæmopoiesis in rabbits under experimental conditions and in man during an attack of therapeutic malaria. As a result of his observations he concludes "it is very difficult to accept the view of Sabin and her colleagues that erythrocytes have an exclusively intravascular origin. . . . Erythropoiesis was always extravascular in character, and mature erythrocytes could be discerned lying outside the endothelial membrane which formed the capillary wall." He finds that sulfosin evokes a leucocytosis in rabbits as well as in man which he considers due to a hyperplasia of the granular element of the marrow. He suggests that the myelocytes under such stimulation arise directly from reticulo-endothelium without passing through the myeloblast stage. Thyroxine, he believes, exerts a profound stimulative effect on erythropoiesis. This action is possibly due to the fact that thyroxine hastens the process of cell differentiation. He describes an elaborate process of amitotic division in the cells of the reticulo-endothelium, but admits that "many of the findings . . . must appear to the reader as fantastic and without secure foundation . . . the phenomena cannot be detected easily, and . . . it is hopeless to search for it in the absence of first-class preparations and equipment." The book is clearly one for the specialist in hæmatology, whom it should stimulate to a closer study of the bone-marrow both in normal, experimental and pathological conditions.

NEW INVENTIONS

A NOTCHED LA FORCE ADENOTOME

AMONG the various references to the La Force instrument for the removal of adenoids, I have found none concerning a small alteration which may recommend itself to those using it without a good light or in a throat obscured by an accumulation of blood. In the medium-sized specimen which I employ I have had made a wedge-shaped notch which fits on to the posterior margin of the septum. When it is in position it is easy to make sure by the sense of touch that the tip is in the middle line. In by far the great majority of cases the point of the instrument reaches the upper extremity of the naso-pharynx, but if there is a vault above the choanæ the shallow notch can be easily freed from the septum and as easily returned to it after the vault has been cleared. The value of the "notch" is perhaps most appreciable when the instrument is used after the enucleation of tonsils. I have found it helpful in cases in which rapidity is necessary, as in a distinguished vocalist for whom I recently removed adenoids under a local anæsthetic. I recommend detaching the adenoids from the lateral fossæ (Rosenmüller) behind the Eustachian tubes by means of the tip of the index-finger and coaxing the mass towards the middle line before introducing the instrument. The notch must be only a shallow one, and it is only a shallow one that the structure of the instrument will stand. Its shape and position are clearly shown in the illustration.



FULL SIZE FRONT

Messrs. Mayer and Phelps, of New Cavendish-street, London, W.1, are the makers.

JAMES DUNDAS-GRANT, K.B.E., F.R.C.S., M.D.

*** We have received from Mr. Arthur Miller, F.R.C.S., an illustrated note describing a La Force adenotome notched with the same object in view. The advantages of the modification occurred independently to Mr. Miller and have been realised in his practice.—ED. L.

THE LANCET

LONDON: SATURDAY, JULY 21, 1934

THE COURT EXPERT

MEDICAL men are included within the definition of "expert" in recently issued Rules of the Supreme Court whereby novel provision is made for the services of a "court expert" in non-jury cases. On the application of either side the court will have a discretion to appoint an independent expert to inquire and report upon any question of fact or opinion. If the expert's report is accepted by the parties, there will obviously be a great saving in time and in the laborious preparation of evidence by the witnesses who otherwise must be called by plaintiffs and defendants. It is probable indeed that, if accepted, the report will lead to the rapid settlement of many claims. On the other hand, if the expert's report is not accepted by all parties, it is to be treated as information furnished to the court and is to be given such weight as the court may think fit. This seems to mean that the judge is free to rely upon it to the exclusion of the evidence of the witnesses produced by the parties at the trial. Each side will be entitled to copies of the report and may then apply for leave to cross-examine the court expert thereon. This cross-examination may be ordered to take place either at the trial itself (the court expert being treated as an ordinary witness and being called at such stage of the trial as the judge may direct) or before an examiner. On giving reasonable notice before the trial, either party will be allowed to call one expert witness (or, in exceptional cases and with leave of the court, two or more such witnesses) to deal with the issue referred to, and reported upon by, the court expert. But the parties who thus call expert witnesses will run some risk as regards costs. Even if they win their case they will not be allowed the costs of their expert witness unless the judge specially certifies both that the calling of such witness was reasonable and that his evidence has materially assisted the court in determining the issue. The parties will, however, be allowed the costs of obtaining the advice of their own expert (whether called as a witness at the trial or not) as to whether the action should be brought or defended, or as to whether, or how far, the court expert's report should be accepted, or as to the matters on which the court expert might properly be cross-examined.

The kind of issue in which the court expert's services may be valuable will not necessarily be a medical question. The new rules contemplate the use of court experts on any scientific matter; recourse may be had not only to medical men but also to engineers, accountants, actuaries, architects, surveyors, and other specially skilled persons. Questions of personal injuries, however, nowadays occupy a large proportion of the total of judicial time; these, and questions involving allegations of negligence in professional treatment, appear to offer occasions for satisfactory recourse to the court expert. It is true that his services are to be limited to non-jury actions, but there seems to be a general drift at present in the direction of eliminating juries if for no better reason than the fact that non-jury actions make smaller demands on judicial time. Be that as it may, the new rules offer an interesting opportunity for the medical profession to play its part in the impartial administration of justice and to remove some of the popular prejudice which the partisanship of expert witnesses has provoked. The scheme is not entirely an innovation; ever since an Act of 1852 the Chancery courts have been able to call on the assistance of experts. Its present application will be experimental; it does not yet extend to the county court. No official provision is made for a panel; the rules merely say that the court expert shall if possible be a person agreed between the parties and, in default of agreement, shall be nominated by the court. He is to receive a fee for his report and for any supplementary work required and also a fee per diem for attendance before a judge or examiner. The court will fix the amount of the fees. If the expert thinks any test or experiment necessary, he is to inform the parties and arrange with them as to his expenses and their attendance.

While an advisory committee has recommended this new use of a court expert, the council of the Law Society has found itself unable to approve the idea. The solicitors think it will be hard for "a so-called independent expert" to arrive at a fair conclusion without himself hearing what other experts and witnesses of fact may have to say—in other words he will tend to usurp functions at present exercised by the court. The council also thinks there is a danger of the court expert finding himself to be, and being regarded by the court as, a person who is not merely about to give evidence but as a person whose evidence is about to be acted upon, so that here too the court expert, and not the court, would come to try the case. The Law Society, of course, is the representative body of an extremely conservative profession which has always been able to find objections—often good enough objections too—to any proposals for shortening and cheapening litigation. The Lord Chancellor's department paid the solicitors the compliment of consulting them about the new rules but was not deterred by their disapprobation.

CANCER VIRUS

IN his Oliver-Sharpey lectures Dr. C. H. ANDREWES gives by far the most complete survey which is available of the phenomena which associate an agent very similar to a virus with the origin of malignant tumours. Since PEYTON ROUS discovered that certain bird tumours could be propagated by cell-free extracts, there has been a growing conviction on the one hand that the Rous tumours are the centre of the cancer problem, and on the

other, that the study of their agents is likely to throw critical light on the nature of viruses. Such a general review as was begun last week in our columns and is concluded on p. 117 is therefore timely. Dr. ANDREWES has little difficulty in showing that the filtrable agents which may be separated from many bird tumours, whether spontaneous or produced by such substances as tar, have a close resemblance in their nature and properties to many of the viruses which are the accepted causes of a number of infectious diseases. And the more such infectious viruses are studied, the less important do their differences from visible microbes become. In a very interesting table Dr. ANDREWES draws attention to the fact that virus-like agents may cause a variety of tissue reactions ranging from pure necrosis at one end of the series to pure proliferation at the other; in the intermediate zone are conditions such as fowl-pox, molluscum contagiosum, infectious warts, and rabbit myxomatosis. If foot-and-mouth disease and vaccinia at one end of the scale are by general consent due to viruses, it is certainly difficult in the face of the graduated series presented to say that a virus is, a priori, an improbable cause of tumours.

One of the most significant qualities of tumours is their extraordinary degree of histological specificity. It is recognisable in human tumours, but their life is so short that the fact emerges in a much more striking form from the study of transplantable tumours watched through many generations. Each mouse carcinoma has its own anatomical characters which it maintains as far as the evidence goes ad infinitum. The same is true of the spontaneous and artificial sarcomata of birds. The simplest explanation is to suppose that this heritable quality is dependent on some genetic change in the cells in which the tumour begins, but this idea is plainly not tenable in view of the fact that the same constancy of structure obtains when the tumours are propagated by cell-free filtrates. On the virus hypothesis, each fresh tumour arising from a filtrate is due to the stimulation of the virus and this implies a specificity of tissue response which is much less pronounced in animals as the result of the influence of accepted microbes. It may be that the actual tissue changes are in these familiar instances directly due to some products of tissue damage—produced alike by staphylococci and streptococci for example—rather than to the actual bacterial toxins. And bearing in mind that no virus has been shown to produce a toxin, and assuming that active viruses are always intracellular, it is perhaps easier to believe that tumour viruses cause these extremely specific anatomical results. Dr. ANDREWES might also, we think, have drawn on the analogy of plant galls in which the anatomical inflammatory reaction is so specific that the species of the infecting parasite can be predicted with certainty from the appearance of the lesion.

The great practical danger of preaching any form of a parasitic theory of cancer is that thoughtless people are too apt to draw the implication that cancer is a catching disease, and to have their attention distracted from the many hygienic measures by which cancer may be prevented. There is of course no evidence whatever that cancer is infectious in any ordinary sense, and however completely the virus-like nature of the agents by which fowl tumours may be transmitted is established, there is no justification for any assumption that this agent is capable of a free and independent life. These considerations bring us to what is, we believe, the pith of the whole problem—where does the virus come from? Does it originate in the tumour or does it come from some extraneous source? Attempts to solve this problem along immunological lines, of which Dr. ANDREWES's own work forms a conspicuous part, give no clear-cut answer, and this is not surprising. It is obvious from morbid histology that malignant tumours are recognised by the normal tissues about them as in some degree foreign, and it is clear that they excite in the body a response which is both local and general. But this is no longer of any great weight in deciding whether they are wholly autochthonous or not. Modern work on the antigenic specificity of denatured and artificially compounded proteins would in fact lead one to suppose that any normal tissue which was so altered as to be a tumour would probably be antigenic to the animal in which it grew. That the cell-free agent may be antigenic is fairly clear, though the specificity of the response is obscure and muddled in any case; this provides no proof that the agent does not arise in the tumour. Dr. ANDREWES believes that it does, and in the concluding parts of his second lecture he inclines to the view that tumour viruses are integral parts of normal cells which under certain circumstances are set free to produce the characteristic changes in the cells. If that is so, the effective discovery of the cause of cancer depends on the definition of the circumstances under which these "indigenous viruses" become active rather than on the study of the viruses themselves. A great deal is known about them already and Dr. ANDREWES's lectures link up very naturally with a whole field of clinical hygienic and statistical work with which he does not deal.

PARLIAMENT AND CHILD MORTALITY

SPEAKING in the House of Commons on June 20th, on a vote for the expenses of his department, the Minister of Health stated that the death-rate of children under 5 years of age from bronchitis, measles, and diarrhœa had been cut down by more than one-half in the last 15 years. During the adjourned debate, which took place on July 3rd, the only reference which appears to have been made to the subject was an expression of satisfaction by Sir FRANCIS FREMANTLE. The fact, if it is a fact, deserves to be given prominence, because the complaint is often heard that the toddler, the child between 1 and 5 years of age, has been neglected in the administrative schemes of local authorities for the welfare of children, and because the respiratory infections have been regarded as the least amenable to control. Diarrhœa has been

recognised as a vanishing disease in epidemic form, and a large part of the credit must be given to the work of infant welfare clinics in educating mothers and putting them in the way of obtaining foods for their infants which are comparatively safe from contamination. The mortality from this cause per 1000 children under 5 years of age has been almost exactly halved since the early post-war years, and there has been no recent outbreak comparable with the exacerbation which occurred in 1921. The menace to child life of diarrhœa may fairly be said to have been overcome.

Examination of the returns of death from the other two causes mentioned by the Minister inspires less confidence. Measles is a disease which is almost regularly biennial in its incidence, although its effect on death returns tends to be smoothed in statistics of calendar years by its usual prevalence in the winter, overlapping the end of one year and the beginning of the next. More important, its incidence fluctuates in long cycles, and we ought to be sure that we are not comparing figures for years on the crest of a wave with those in a trough. It is not unlikely that we are at present going through a period of rather low prevalence, so that a comparison with the early post-war years when a wave was just dying may be quite misleading. As regards bronchitis, again, it would obviously be wrong to compare the mortality in 1918–19 with any other year or group of years. For one thing there were years of epidemic prevalence of influenza; for another, the fatality among the children was relatively lower then than in other major epidemics before or since. The picture is therefore confused. But it is true that the death-rate under 5 years of age from bronchitis has been consistently running in recent years at a level half as high as that reached in 1919–20. The significance of these figures is doubtful. A far larger number of deaths under 5 years of age is now classified under the heading pneumonia than bronchitis. For instance, in 1931 12,634 deaths at these ages were attributed to pneumonia (all forms) against 2928 from bronchitis. The discrepancy was not nearly so great in 1920 and 1921; in the former year pneumonia accounted for less than twice and in the latter little more than twice, the number of deaths classified as due to bronchitis. Now, the mortality from pneumonia among children has not declined to nearly such a striking extent during the last 15 years. The rate in 1930–32 was approximately two-thirds of that in 1920–21. Indeed, in 1929, when influenza was epidemic, and with a smaller population at risk, there were more deaths from pneumonia in children under 5 than in any year since 1918.

It is important that we should be clear on these points, because practical issues are involved. In a letter which appeared in *The Medical Officer* of July 7th Prof. R. M. F. PICKEN draws attention once again to the problem of overcrowding in dwelling-houses and its effect on child life. This observer points out that it has been customary for many years to allocate less cubic or areal space to children than to adults. For instance, model by-laws for houses let in lodgings or in an improvement area issued by the Ministry of Health since the passing of the Act of 1930 provide at least 40 sq. ft. per adult occupant of a room used for sleeping purposes, but only 30 sq. ft. for each child. If it be true, as Dr. PERCY STOCKS suggests in a recent analysis of death-rates in relation to density of occupation,[1] "that the effects of overcrowding are far and away most serious at the pre-school ages," and that the selective effect of crowding upon child mortality is largely manifested in respiratory causes of death, it seems irrational to maintain a low standard of spacing for families with young children. The influence of spacing upon the incidence of droplet infections has been repeatedly shown, the most outstanding examples being found in the work of J. A. GLOVER[2] on cerebro-spinal meningitis and of SHELDON DUDLEY[3] on the common infections of childhood. Overcrowding in houses is, from the medical standpoint, one of the most important aspects of the housing situation. It is understood to be the objective of the next move in the Government's housing campaign. Standards of crowding will have to be embodied either in the Bill itself or in by-laws of local application but with some national uniformity. Outside medical circles it does not seem to be realised that young children, above all others, require the maximum amount of air-space which can possibly be provided for them. It would be a mistake to attach too much significance to statistics showing the fall of mortality from the air-borne infections of childhood over a period which is short and probably in some respects exceptional.

THE NATIVE'S DOCTOR

THE provision of adequate medical and sanitary services in the sparsely populated areas of tropical and subtropical countries, constitutes one of the major problems of administration. A number of difficulties stand in the way of a satisfactory solution of the problem. In the first place, there is the economic status of the population which, generally speaking, is pastoral, with a low-earning power, and is widely scattered over country in which travelling is frequently very difficult. It is for the most part impossible to expect such a population to pay for their medical services. On the other hand, the financial position of many of the countries which they inhabit precludes the provision of a fully paid Government service. Some colonies, notably French Equatorial Africa and Uganda, are developing a system of medical and sanitary services for the natives by means of a native subordinate personnel, at the head of which are European doctors. The native personnel consists of medical orderlies, a few female nurses, and men educated almost, but not quite, to the grade of medical practitioners. In Uganda these are designated senior African medical assistants. Their training is carried out at the local medical school with which is connected a fully equipped

[1] See THE LANCET, 1934, i., 1180.
[2] Medical Research Council, Special Report Series No. 50.
[3] Ibid., No. 111.

training hospital. They are licensed to practise medicine under the local laws, and are placed in charge of the larger dispensaries and also hold certain hospital posts under the European medical officers. The Uganda system has only been in operation for a short time, and it is perhaps a little early to be certain of its usefulness. So far, however, the experience with it has been satisfactory.

The South African Government has recently decided to institute a somewhat similar system of training in connexion with Lovedale College, which is a Government subsidised institution for the higher education of natives. The establishment of a training school for what will be known as "medical aids" has now been sanctioned, and owing to a generous gift of £75,000 from the Transvaal Chamber of Mines it has become possible to begin training during the present year. The South African medical aids will be admitted to the medical school after passing at least what is known as the Junior Matriculation examination. They will then be given a preliminary education at the college, principally in language, physics, and chemistry. Those who in this first year prove their capacity for further education will then enter upon a four-year course in medical subjects, both theoretical and practical, at the expiration of which they will be given a joint certificate from the public health department and the Lovedale College, that they have satisfactorily completed the course, and this certificate will automatically entitle them to enter the Government medical service as medical aids. They will then be given a year of special training directed towards familiarising them with the particular work in which they would be engaged in the service—for instance, leprosy, malaria, general dispensary work, and so forth. They will not be licensed to practise medicine for gain, but only to practise under defined conditions as long as they remain in the Government service. The scale of emoluments, which includes a free house, has, it is thought, been made attractive enough to secure the best class of candidate; the salary will start with £240, rising to £300. In addition to the medical aids, it is also proposed to increase the facilities, at present inadequate, for training native girls as nurses and midwives, and also for the establishment of a lower grade of nurses, both male and female, to be known as "nurse aids."

It will be noticed that the medical assistance is stressed rather than preventive service. The ultimate aim of medical services for natives is, of course, prevention, but experience has proved beyond a peradventure that in order to inaugurate a successful preventive service in native areas, it is essential first of all to gain the confidence of the inhabitants by offering them adequate curative services. For many years to come curative and preventive services will have to march side by side and hand in hand. This point emerged clearly from the deliberations of a conference, held under the auspices of the League of Nations in South Africa in 1932, in which representatives of the medical services of most African colonies and also India took part, and it is also emphasised in the description of the subdispensary system in Uganda, by Dr. W. LESLIE WEBB, in the *Tropical Diseases Bulletin*, June, 1934. In South Africa, in Uganda, and in French Equatorial Africa, the ultimate aim is to establish rural dispensaries based on a centrally located hospital, the medical personnel of which will by periodical visits constantly supervise the work of these dispensaries. The importance of the preventive side of their work will be impressed on the medical aids, the nurses, and midwives, not only during their training but also thereafter; and it is hoped, with some justification, that gradually these dispensaries will become centres for the spread of knowledge of community and personal hygiene. They will no doubt from the very beginning be useful intelligence centres for the discovery of threatened epidemics. These experiments, in the technical if not professional education of the native, will certainly be worth watching during the next decade, and it will be of interest to note which of the various schemes in operation appear to give the best results.

A STATUTORY HOUSING COMMISSION

IN its final report[1] the National Housing Committee, whose interim report we noticed a few weeks ago,[2] has developed its plea for the establishment of a statutory housing commission with cogent argument. The proposed body would in no way supersede but would assist the local authorities to implement a policy of building on a ten years' programme over the whole country. Under this scheme the Minister of Health would retain general control over borrowings and over the amount and nature of any Government subsidies, and would also keep his quasi-judicial functions, such as the confirmation of compulsory purchase orders, clearance orders, and by-laws. But the Commission would take over certain powers: it would obtain estimates of housing needs from the various localities; would be vested with the power to approve location and coördination of sites, purchase price of land, cost of building, and type of houses to be erected; would be charged with powers to carry out duties in the matter of housing which had been neglected by a local authority; and would act as the adviser to the Ministry on technical matters. The general duties of the Commission would include making surveys of housing needs, the organisation of labour and materials, research, the formation of public utility societies, the encouragement of decentralisation, the supervision of plans for large scale reconditioning, the financing of local authorities and public utility societies at trustee rates of interest, and, most important, the control of the pace at which the programme is carried out. Precedents are quoted, for example, the Central Electricity Board, for the establishment of a body which should be independent of politics and also able to provide a continuity of policy. The case for and against the proposals is being discussed in the House of Lords as we go to press, and we anticipate that the argument that such a Commission would prove to be the best agency to secure the provision of a million new houses in ten years will not be found easy to refute.

[1] A National Housing Policy. London: P. S. King and Son. 1934. Pp. 84. 2s.

[2] See THE LANCET, 1934, i., 1123.

ANNOTATIONS

A FESTSCHRIFT TO SIR ROBERT MUIR

THE last number of the *Journal of Pathology and Bacteriology*, issued on July 5th to celebrate the seventieth birthday of Sir Robert Muir, F.R.S., is wholly written by his pupils, and we notice that among the contributors are 11 professors of pathology or bacteriology. This fine volume of 253 pages, with 52 plain and coloured plates, is a noble tribute of respect and affection to one whose influence and leadership in British pathology is unique, not only as the author of deservedly popular text-books which are widely used, but as the inspirer of many able young men to lead fine lives. There are in the number 19 substantial contributions to knowledge; and between them they cover practically the whole range of topics with which pathology is concerned. Prof. M. J. Stewart, of Leeds, along with Dr. J. S. Faulds, describes the silicosis and siderosis of the lungs in Cumberland hæmatite miners; tuberculosis is generally present as well. Dr. J. W. McNee, in London, records and illustrates two remarkably large spleens which he thinks may as well be called sarcoma as anything else. Prof. J. Shaw Dunn, of the Royal Infirmary in Glasgow, contributes an interesting discussion of nephrosis and nephritis in which he correlates the morbid histology with the views of physiologists about renal function. Prof. J. H. Dible, of Liverpool, questions the correctness of the usual interpretation of fatty degeneration of heart muscle, and as the result of a number of combined chemical and histological examinations concludes that the extra fat is depôt fat brought in from elsewhere, and not the result of disintegration of the cardiac protoplasm. Dr. Ivy Mackenzie, of Glasgow, discourses on two well-studied cases of degeneration of the lateral geniculate bodies and discusses the light which they throw on the pathways of visual sensation. Prof. J. Cruickshank, of Aberdeen, has an elegant method of studying the growth and metabolism of photogenic bacteria from sea fish by photographing the colonies by their own luminosity. Dr. Sutherland Strachan analyses the incidence of malignant disease in Johannesburg and points out the relative abundance of primary carcinoma of liver in the natives, its association with cirrhosis, and its early age-incidence. Prof. J. W. McLeod and his associates at Leeds discuss the diagnostic isolation of the gonococcus, and Dr. R. Cruickshank, of Glasgow, confirms his previous suggestion that the characteristic acid reaction of the vagina is due to the fermentation of the epithelial glycogen by Döderlein's bacillus. Other papers by Dr. J. W. S. Blacklock, Prof. D. F. Cappell, Prof. C. H. Browning, Prof. T. J. Mackie, Prof. E. M. Dunlop, Dr. J. W. Howie, Dr. J. Kirkpatrick, Prof. G. H. Wilson, Prof. J. S. Young, Dr. J. A. W. McCluskie, and Dr. Janet Niven are no less interesting, and come from Dundee, Edinburgh, Newcastle, Birmingham, and Belfast, as well as Glasgow. The whole forms a record of which any school might justifiably be proud, and we doubt whether Sir Robert Muir had any other present on his birthday which pleased him as much. We wish him many happy returns.

THE POSITION OF THE AMERICAN HOSPITALS

IN the quarterly *Bulletin* of the American College of Surgeons, just issued, a statement will be found on the situation of the American hospitals under the National Recovery Programme. The statement is furnished by Sister John Gabriel, an educational director of the Sisters of Charity of Providence, and she has gone to authoritative sources for her information and reasoning. The working of the National Recovery Act was at first viewed with apprehension by hospital executives, who saw before them in its provisions the burden of additional obligations in any attempt to achieve the standards set forth for re-employment. Accordingly the committee of the American Hospitals Association, which included representatives of the Protestant and Catholic Hospital Associations respectively, decided to ask for exemption from the Act on the basis of inability to meet the necessary financial commitments. Representatives of the three associations stated their case effectively, legal support for exemption was obtained, and the three associations received an official letter that private hospitals did not come within the purpose and scope of the National Recovery Act. All hospital managements have recognised the patriotic decision of President Roosevelt to adjust the stupendous problem before him, but further financial burdens could not be borne by the majority of the voluntary hospitals of the United States, and the attempt to carry them would have led to many disasters. The arguments which prevailed for exemption were set out last September in the *Bulletin* of the American Hospitals Association by the well-known constitutional lawyer, Mr. Borden, and the point was then made that hospitals cannot be considered as industries; they are not producing organisations but charitable institutions, and the restrictions of their operations would add to the cost of illness for the public. The right of recognition by the Government that hospitals are relief agents and not commercial enterprises may not be formally admitted, and it is difficult in some cases to assert of certain enterprises that they are purely welfare institutions maintained for charitable purposes. There are difficulties ahead, but there is promise that they will be surmounted.

THE ÆTIOLOGY OF INFLUENZA

IT will be recalled that R. E. Shope has produced evidence that swine influenza is caused by the action of two infective agents, a virus and a bacterium (*Hæmophilus influenzæ suis*). A year ago Smith, Andrewes, and Laidlaw reported in our columns that the swine influenza virus would produce in ferrets a disease like that which they obtained when these animals were inoculated with a virus believed to be that of human influenza; this consisted of fever and symptoms referable to inflammation of the nasal mucosa. Shope [1] has now confirmed and extended this observation. He finds that if the instillation of swine influenza virus into the nose is made under ether anæsthesia, the ferrets develop not only nasal infection but an acute pneumonia of lobar distribution; in a number of animals this has proved fatal. The affected lungs were "deep bluish-red in colour." The histopathology was "essentially that of an edematous pneumonia"; the alveoli were distended, containing fibrinous exudate with a few cells, and the alveolar walls were much thickened. A point of great interest is that the lung lesions were apparently caused by the virus acting alone. There is thus a contrast with the disease produced by the same virus in pigs, where the presence of a bacterium in addition to the virus is necessary to produce the

[1] Jour. Exp. Med., 1934, lx., 49.

complete disease picture. The interest of these studies in relation to human influenzal pneumonia is obvious. More difficult of interpretation is a paper by A. Eichhorn and N. J. Pyle.[1] These workers obtained last year from Smith, Andrewes, and Laidlaw some of the virus which they had isolated from human influenza. With this they were readily able to infect ferrets at the Lederle laboratories near New York. Work on dog distemper is in progress at the same laboratories, and the ferrets recovered from the influenza were used for this distemper work. It was unexpectedly found that they were partly immune to the distemper infection; a few proved quite insusceptible and the remainder went down after a longer incubation period than usual. A second experiment confirmed this result. The authors believe that "the experimental data suggest a possible relationship between influenza in man and distemper in dogs." No evidence is offered as to the reaction of distemper-immune ferrets to the influenza virus; but the results of further studies on cross-immunity and of cross-neutralisation tests with antisera are promised. Until these are available we shall do well to suspend judgment on the possible importance of the observations. The behaviour of the distemper and influenza viruses in the ferret is, however, so entirely different, that on this ground alone a close relationship between the two viruses would be surprising.

CONGENITAL TORTICOLLIS

THERE seems to be some discrepancy in the opinions expressed by different observers on the relative frequency of the congenital as opposed to the acquired type of torticollis. It is possible that this may be due to disagreement as to the criteria on which the diagnosis of a congenital lesion shall rest, for according to Dr. Garry de N. Hough,[2] who analyses 39 cases from 1898 admissions to the Shriner's Hospital for Crippled Children, Massachusetts, during the years 1925 (February) to 1933 (September), a great proportion of children are not brought for treatment until infancy is well past. There seems to be a slight predilection for the right sternomastoid muscle rather than the left; the condition is as common in boys as in girls. It is noteworthy that the incidence has increased from 0·4 per cent. in 1925 to 3·5 per cent. in 1932 and 1933.

Of the different theories of ætiology advanced at different times, hæmatoma caused by birth injury, infective myositis, and ischæmic fibrosis have perhaps received most attention by recent writers. Of these theories Hough favours that of ischæmic fibrosis, and in support he cites the experiments of B. Brooks, who produced an analogous condition in the sartorius of the dog by venous ligation, and of P. N. Jepson, who found that venous blockage of a few hours' duration could give rise to persistent fibrosis. The vascular disturbance associated with torticollis in children is presumed to arise from forced positions of the head during delivery. Pathological examination of the tumour, present in the sternomastoid in a fair proportion of the cases, does not lend much support to the theory that it has originated in a hæmatoma. The histological appearances are more like those found in the brachialis in Volkmann's ischæmic paralysis. Facial asymmetry of some degree is an almost constant feature of torticollis of the congenital type; often it is very noticeable. That it is a direct result of the oblique position assumed by the head is shown by the fact of its occurrence in other conditions, such as scar contractions and tuberculous disease of the spine, in which unilateral flexion of the head is present. Correction of the deformity of the neck is followed by gradual growth of the face and ultimate disappearance of the asymmetry. In Hough's cases the recovery was complete in from two to four years. He draws attention to an apparent *increase* in asymmetry of the face in the months immediately succeeding operation; this is, of course, an illusion due to the emphasis of the deformity when the head is held upright. The late appearance of the children for treatment is rather remarkable. In Hough's series of 39 cases, only four were under 18 months of age. Hough believes that this is to be accounted for by a late development of the deformity, and not by failure on the part of the parents to notice it. If this is so, the explanation is that the injury to the muscle —if such occurs—results in deficiency in growth, and not in contraction of its fibres. Subcutaneous tenotomy is not recommended by Hough, but open division of the sternal, and, if necessary, of the clavicular, head of origin of the sternomastoid. Excision of the sternal head is not only unnecessary, but has the disadvantage of producing an unsightly prominence of the inner end of the clavicle. In the most severe cases plastic lengthening of the muscle can be done, and even division of the mastoid attachment. The results of the operation are said to be good, provided care is taken in the after-treatment. Fixation in the corrected position was applied by helmet or collar for approximately six weeks, and subsequently treatment was by active and passive stretching, corrective exercises, and massage. When the patient is fortunate enough to be brought for treatment in infancy, most surgeons agree that cure can be quite successfully effected by daily passive stretching of the muscle into the markedly overcorrected position over a period of three months.

[1] Jour. Amer. Med. Assoc., 1934, cii., 2082.
[2] Surg., Gyn., and Obst., March, 1934, p. 972.

PERSPECTIVES IN PHYSIOLOGY

LAST week we had occasion to comment on the philosophy of the professor of physiology of the University of Cambridge. His colleague at Edinburgh in his inaugural lecture, published in the June issue of the *Edinburgh Medical Journal*, has also, from a different approach, made a contribution to the problem of academic physiological teaching which merits consideration. Modern tendencies in research and modern difficulties in teaching are set out; in Prof. Daly's opinion the latter are not insuperable, and he concludes with one or two constructive suggestions. With regard to research he champions the method of studying the isolated organ, and rightly points out that, although it is placed in an abnormal environment, this is at least controllable and allows of accurate observation and repetition of experiment. Mistakes in the interpretation of results and their too precipitate application to the normal organ do not invalidate the method, which is responsible for the majority of our recent acquisitions of knowledge. With regard to teaching, he welcomes the prevailing dissatisfaction with the present system, "for progress is built on the realisation of imperfection." His proposals are two. The first deals with the teaching system in the pre-clinical subjects; he suggests a short systematic course in each subject to be followed by a correlative course:

> "If this came about, we could look forward to . . . a series of *n consecutive* lectures to be held on the anatomy, morphology, histology, physiology, biochemistry, and pharmacology, say, of the digestive organs, to be delivered by A, B, C, D, and E. Following each other in orderly sequence, and given by the experts in each branch, these lectures would bring together all the knowledge necessary

for the student in this particular field and give him an outlook which is only possible under the present mode of rigid separation by a vast amount of labour."

Prof. Daly pleads for "a trial in a small way" for this progressive scheme—progressive because it typifies the modern decline of omniscience and growth of collaboration, and because it prepares the student's mind for the synthesis of organs and systems and "subjects" into persons, which too often, in the hospital, comes as a shock to him. The second proposal relates to the student, embodying the suggestion that he comes to the university to learn rather than to be taught. Every teacher knows the difference between the man who regards his course as an opportunity to acquire as much knowledge as he can in the time, and the one who sits through it like a young bird in a nest with its eyes shut and its mouth wide open waiting for the morsels to be dropped into it. It is perhaps regrettable that the curriculum tends to be moulded to the needs of the latter, who ought not to be encouraged. However this may be, there is no doubt whatever of the excellence of the suggestion here made that:

"Four, five, or even six . . . students get together in each other's rooms for the discussion of some pre-arranged physiological problem, say twice a week for one hour . . . they will gain a greater insight into the problems which beset them than they will as the result of many hours' reading on their own—they will certainly come to know physiology."

The same system might be applied to any branch of study. It is impossible to teach everything; beyond a certain point attempted improvement by selection and elimination defeats its object. The students at Edinburgh are fortunate in having a teacher with such a balanced outlook as this lecture displays, and others interested in the subjects of which he treats would do well to read it as an epitome of common sense.

JAUNDICE IN SYPHILIS

JAUNDICE occurs every now and again in the experience of all those who treat large numbers of syphilitics by modern methods, and it can be a very severe complication. Exactly what causes the symptom has always been a puzzle, and an exhaustive survey of the incidence of jaundice among over 10,000 cases of syphilis by U. J. Wile and W. M. Sams[1] does not clear up the ætiology. The cases were observed during a period of eight years, and it is of interest to note that they include 1040 cases of congenital syphilis. The cases of jaundice are divided up for investigation into pre-therapeutic and post-arsphenamine groups. In the first group diagnosable syphilis of the liver occurred in 91 cases (0·9 per cent.). The authors were at great pains to corroborate their diagnosis by every possible means, and believe that they have under- rather than over-estimated the actual amount of liver disease. The conditions recognised in clude early hepatitis (*a*) icterus gravis, (*b*) benign icterus, and chronic hepatitis (*a*) cirrhosis, (*b*) Banti's syndrome. Of the 91 affected livers only 13 gave rise to clinical jaundice; 2 patients had raised blood bilirubin, 1 gave a history of recent jaundice, and 2 had so-called catarrhal jaundice, giving a total of 18 cases of jaundice, or 0·18 per cent. of the total cases. Other authorities quoted show 0·37 per cent. (Werner) and 0·28 per cent. (Goldstein).

The number of cases treated by arsenic was 4126 in all, and of these 56 developed jaundice—i.e., 1·35 per cent. Figures from other authorities show a wide variation from 0·6 per cent. to 5 per cent. L. W. Harrison found that jaundice occurred less frequently than dermatoses but his cases were very severe and persistent. Taking the figures of Wile and Sams for both groups it will be seen that post-arsphenamine jaundice occurs 7·5 times as frequently as pre-therapeutic jaundice. On analysis it was shown that arsphenamine was to blame in twice the number of cases, calculated as a percentage, as neo-arsphenamine; that the intensive method of treatment (three injections in three days) did not produce more jaundice than the ordinary weekly method, and that no case of post-arsphenamine jaundice occurred in congenital syphilitics under 10 years of age. Further investigation showed that the cases could be divided into two groups, depending on the interval between injection and jaundice. In the early group the reaction occurred soon after an injection, either the first, when it was probably a Herxheimer reaction and the jaundice was transient, or after any dose when it may have been due to an overdose or to an idiosyncrasy. The cases of late post-arsphenamine jaundice include two-thirds of the total cases, and the authors found this to be the most puzzling group. This type of jaundice always occurred during the rest period between two courses of injections, an average interval being 80 days after the last injection. The theories as to the cause of this delayed jaundice are: (1) It may be a delayed toxic action on the liver; this is not proven by experiments, which fail to show an excess of arsenic in the excretions of these cases. (2) It may be due to a hepato-recurrence, which means that during the interval between the injections the liver has suddenly relapsed, due to insufficient treatment. It is known that mucus relapses occasionally occur, but the fact that most of the cases in this series were on some heavy metal during the relevant interval rules this out, as well as the fact that there were no cases of serological relapse. There is still another possibility (3) that these cases are merely manifestations of catarrhal jaundice occurring in a syphilitic patient. Blood counts and blood bilirubin estimations show no appreciable differences between syphilitic and non-syphilitic catarrhal jaundice, and it is difficult to exclude the possibility of coincidence. But the remarkably constant period after injection at which jaundice appears lends colour to the view that patients treated with a powerfully hepatoxic drug are more prone to exhibit the syndrome than persons with an apparently normal liver.

[1] Amer. Jour. Med. Sci., 1934, clxxxvii, 297.

INTERNATIONAL CONVENTION FOR SUPPRESSING NARCOTIC DRUGS

AT the meeting of the Council of the League of Nations on May 26th, 1933, it was resolved to communicate to the various Governments a draft international convention for the suppression of illicit traffic in dangerous drugs together with a report of the Opium Advisory Committee thereon. Replies have been received from 32 Governments, 23 of whom are in favour of concluding a new convention; others have suggested modifications of the draft, while the United States and South Africa are not prepared to participate in the proposed convention. The Council, on the representation of the rapporteur, the Polish delegate, instructed the advisory committee to study the replies received and to prepare an annotated draft convention for submission to the Governments in accordance with the new procedure laid down by the Assembly in 1931. The Permanent Central Opium Board at its last meeting had its attention drawn to

the accumulation of stocks of narcotic drugs which appeared to be disclosed by the statistics that had been furnished. It noted information supplied by the Hungarian Government regarding a new process for the manufacture of morphine in Hungary. It also investigated the considerable imports into Honduras of narcotic drugs of European manufacture in excess of legitimate needs, such imports having apparently been effected by false import permits. It is hoped that the new convention, when approved and ratified, will obviate a recurrence of such traffic and also secure the unmasking and adequate punishment of the master minds behind the contraband trade; these are often discovered in other countries than those actually concerned in the illicit commerce.

MEDICAL INSURANCE AGENCY

THE meeting of the committee of management of the Agency, followed by the general meeting, was held on July 12th, when the report and audited accounts were duly received and passed. The report showed progress in business transacted. The recommended assurance proposals dealt with during the year totalled 321, as against 302 in the previous year; during the year 900 contracts were effected, consisting of 1336 units providing for annual pension cover of £133,000. In regard to motor-car insurance the report showed that the Agency still makes an appeal to members of the profession in face of increasing competition, and while it is allowed that it has not been always possible to satisfy members in the matter of claims and settlements, in the main amicable settlements have been arranged.

After allowing for the commitments of the committee under various covenants already incurred, the sum available for distribution, in addition to the surplus unallotted from the previous year, was £1984.

The following distribution was made:—

	£	s.
Royal Medical Benevolent Fund—		
Under the 7 years' agreement	1260	0
For general purposes	200	0
Ladies' Guild of the R.M.B.F.—		
For general purposes	200	0
Earmarked for educational grants for the year 1934–35	115	0
Royal Medical Foundation of Epsom College—		
For general purposes	210	0
Further towards endowment of Dawson Williams Memorial Scholarship	600	0
Girls' Education Subcommittee	300	0
Royal Hospital and Home for Incurables, Putney	52	10
	£2937	10

The great value to important medical charities of the financial support of the Agency is expressed in the figures. With the allocation this year of a further £3000 (all but) to these purposes the total contribution to medical benevolence of the Agency, since its foundation 25 years ago, is brought up to £35,625 5s.

AMIDOPYRIN AND AGRANULOCYTOSIS

FROM a study of the 473 recorded American cases of agranulocytosis, R. R. Kracke and F. Parker[1] have come to the conclusion that the condition may be caused by any drug containing the benzamine group—especially arsphenamine and neoarsphenamine (arsenobenzol and novarsenobenzol), benzene, acetanilide, phenacetin, and amidopyrin (Pyramidon)—acting on a susceptible marrow. They find that the disease is commoner in physicians, nurses, and their relations, than in other people; for instance, it has been observed 50 times more often in doctors than in lawyers, and 200 times more often in nurses than in women school teachers. This peculiar incidence they put down to the fact that those connected with the medical profession are more likely than other members of the community to use this group of drugs. Agranulocytosis appears also to have a curious geographical distribution, most of the cases having been reported in Germany and America, with about 100 in France, whereas the disease is rare in Russia, Poland, and the Far East, and extremely rare in Great Britain. Kracke mentions 6 cases in England compared with a total of 823 in Germany and America. It is suggested that this may be due to variations in the type of drug employed in the different countries. Very few cases are recorded in negroes, and in most of these the onset was preceded by novarsenol therapy.

The Council of Pharmacy and Chemistry of the American Medical Association have been so struck by the possible association between amidopyrin and agranulocytosis that they have issued a special report on the subject by Dr. Paul Reznikoff[2], together with an official comment. Having summarised the recorded cases, Reznikoff concludes that "from the evidence at hand there can be no question that amidopyrine is very important in the production of granulocytopenia. In fact, no other agent has been found, either chemical or bacterial, which has been a factor in causing so many attacks. In the second place no definite case has been reported in which a barbiturate alone is responsible." He agrees that there are definite cases of agranulocytosis in which amidopyrin has never been taken, and that an enormous number of people who take the drug do not develop symptoms. The same is true of arsenobenzol, and clearly sensitiveness in certain patients rather than a universal action of the drug is the explanation of these findings. The Council concurs in Reznikoff's recommendation that indiscriminate administration of amidopyrin is dangerous and should be discouraged. They also draw attention to the large number of proprietary preparations which contain it.

STRUWELPETER-HOFFMANN

JUST as the author of "Alice in Wonderland" eclipsed the mathematician C. L. Dodgson, so the author of the "Struwelpeter" poems has eclipsed a distinguished neurologist and reformer of mental hospitals. It seems unlikely that in 1845, when the poems were published, Heinrich Hoffmann, lecturer in anatomy at the Senckenbergsche Institut in Frankfurt, regarded them as his most convincing claim to fame. Yet his very real services in other directions are now mostly forgotten; and this has led Dr. O. G. Foerster[3] to rescue some of them from obscurity, in celebration of what would have been his 125th birthday on June 13th. Hoffmann, he tells us, was born in Frankfurt, and after studying medicine in Halle and Paris it was to Frankfurt that he returned to take up practice. Here with five friends he founded a clinic for the poor people from the country districts round the town. In 1845, soon after his appointment to the Senckenbergsche Institut, he once more showed his enterprising spirit by starting a medical society. In 1851 he succeeded Varrentrapps as director of the Frankfurt Mental

[1] Jour. Lab. and Clin. Med., 1934, xix., 799.

[2] Jour. Amer. Med. Assoc., June 30th, 1934, p. 2183.
[3] Münch. med. Woch., June 29th, 1934, p. 985.

Hospital, where he found patients in all stages of mental diseases housed together in insanitary surroundings. The nursing and supervision was bad, and no attempt was made either to cure or to help these unhappy people. After 13 years of strenuous propaganda Hoffmann succeeded in collecting the money to build a new hospital, and when it was opened in 1864 he was elected director. He is said to have treated his patients with endless patience and kindness, and for them, as for his children, he wrote poems and stories and plays. In his professional writings Hoffmann avoided hypothesis, and described rather his own experiences, experiments, and successes. His humorous works include a satire on contemporary fashionable watering-places and spas.

In 1889 Hoffmann retired, but he continued to live in Frankfurt until his death in 1894.

LECTURE NOTES BY KEATS

John Keats was born in October, 1795, and died of phthisis in February, 1821, at the age of 25. In October, 1815, he joined the medical school of Guy's Hospital, and in July, 1816, three months before he came of age, passed the examination of the Apothecaries Society and became a qualified medical man. The next year, 1817, he published his first book of verse to be followed in 1818 and 1820 by further poetry. During his brief life Keats met with considerable hostile criticism, and his genius was perceived only by the discerning few; but posterity has given him full recognition, and the house at Hampstead where he lived is now a shrine and a museum of relics of the poet. It is to this museum that his anatomical and physiological notebook [1] was bequeathed by Sir Charles Dilke.

The poetry of Keats was said by Francis Palgrave when professor of poetry at Oxford to be characterised by "Copiousness in exquisite details, and perpetual freshness of phrase . . . Keats is hence a poet especially fit to be read as a bee tastes a flower, a little at a time, and in those pleasant places which he loves and describes so well." A search through his lecture notes fails to reveal these qualities, and it is evident that, like a sensible man, Keats, when attending professional lectures for which no doubt he had paid his fee, confined his attention strictly to business. The notes are interesting because they give some idea of anatomy, physiology, and pathology as taught at the time. The chief lecturer seems to have been "Mr. C.," later Sir Astley Cooper. A lecture on the nervous system gave occasion for the following note: "In diseases medical men guess, if they cannot ascertain a disease they call it nervous." The lecturer also points out that disorder of function may occur without "anatomy being able to discover a corresponding breach of structure." It is interesting to see that atheroma was well recognised, but attributed to "ossification" of the arteries. The condition was known to be the constant effect of age, and it was also known that in the young "a life of intemperance" might lead to it: the site of attack was between the muscular and membranous coats of the artery. The lymphatics at that time were attracting attention and were called "absorbents."

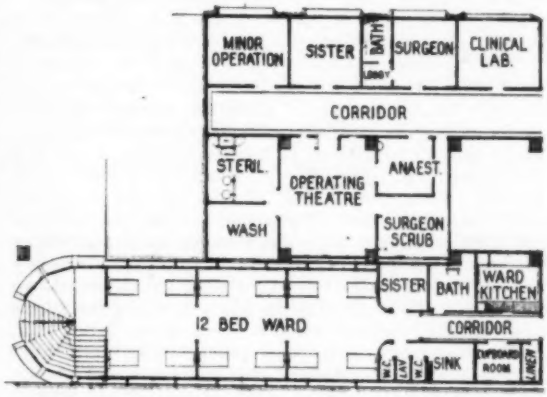
There seems to be only one point about this matter-of-fact little notebook that might give a hint that its owner was a poet. On p. 27 Keats has sketched at the margin of some rather dull notes four little drawings of flowers, one of which is standing in what appears to be a small medicine bottle. This page is reproduced as an illustration, and it has a pathetic interest in view of the following letter cited by Palgrave [2] as written by Keats shortly before his death: "How astonishingly does the chance of leaving the world impress a sense of its natural beauties upon me! Like poor Falstaff, though I do not 'babble,' I think of green fields; I muse with the greatest affection on every flower I have known from my infancy—their shapes and colours are as new to me as if I had just created them with a superhuman fancy. It is because they are connected with the most thoughtless and the happiest moments of our lives. I have seen foreign flowers in hot-houses of the most beautiful nature, but do not care a straw for them. The simple flowers of our spring are what I want to see again."

Sir William Hale-White has had the present notebook reproduced photographically and has presented copies to various institutions including the Royal Society of Medicine and the Keats Museum.

[1] John Keats's Anatomical and Physiological Notebook. Edited by Maurice Buxton Forman. London: Humphrey Milford, Oxford University Press. 1934. Pp. 68. 12s. 6d.

BRITISH INDUSTRIES HOUSE

OUR readers already know that in connexion with the British Industries House a medical section has been organised to afford a prominent display of hospital equipment. The official opening of the medical buying centre is taking place as we go to press (Thursday, July 19th), the inaugural ceremony being performed by Lord Derby, with a reception committee consisting of Lord Dawson of Penn, Lord Horder, Sir Humphry Rolleston, and Sir Holburt Waring. The intention at the British Industries House is to provide showrooms at rates having no



close relation to economic return in order that the sale of British productions may be stimulated. With this in view the medical centre has been established, where facilities are provided in one central building for manufacturers to exhibit objects and material used in connexion with hospital equipment and administration, as well as by the medical profession generally. The important underlying hope is that this development of British industry will assist in the reduction of unemployment. From the accompanying plan of the operating theatre and ward block (designed by Messrs. Adams, Holden, and Pearson), which provide a background for many of the exhibits, it will be seen that opportunities will be found in the building for inspection of most features of hospital work.

[2] Palgrave, F. T.: The Poetical Works of John Keats. Golden Treasury Series. Macmillan. 1892.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XI.—PROGNOSIS OF LOBAR PNEUMONIA

THE course of lobar pneumonia is so brief and, in general, its delimitations and its accidents are so well known that in the matter of prognosis it might seem to offer fewer difficulties than other diseases of longer duration or greater complexity. An analysis, however, of the factors influencing prognosis discloses so many variables that to submit secure rules for guidance in the individual case is an impossibility. Nevertheless the experience of generations, statistical studies, and a close attention to the natural history and varying circumstances of the disease have, between them, provided us with much useful information.

The factors influencing prognosis may be divided into two categories, the general and the particular; those concerned with the disease as a whole, and those concerned with the disease as witnessed in the individual patient.

GENERAL FACTORS

In the first category we must consider broadly the observed facts relating to mortality. With morbidity we need have small concern, for the vast majority—probably 90 per cent.—of patients who recover from lobar pneumonia do so completely. It has long been appreciated that the mortality of pneumonia varies considerably with country, social environment, epidemic, age, preceding ill-health, and constitutional states, and we now know that the type of invading organism also plays its part. Pneumococcus type III. has the highest virulence, but types I. and II. account for two-thirds of all cases and of these type II. gives the higher mortality.

The general mortality as gauged by hospital figures in England and Scotland lies between 15 and 20 per cent. At Guy's Hospital during the nine years ending in 1930 the mortality between the ages of 13 and 75 years was 16 per cent. (Ryle, J. A., and Waterfield, R. L.: Guy's Hosp. Reports, 1933, lxxxiii., 389). One-third of the deaths occurred over the age of 50. There were no deaths between the ages of 15 and 20. The experience of consulting physicians in private practice is fallacious, as they are naturally called to the more anxious cases; Osler gave the mortality in his personal practice as approaching 50 per cent. (Amer. Jour. Med. Sci., 1897, cxiii., 1). In general practice the mortality-rate is lowest, and Osler, quoting the report of the collective investigation committee of the British Medical Association, which was based chiefly on such practice, gave it as 12 per cent. In the case of picked populations low figures are also the rule, and A. Abrahams (THE LANCET, 1920, ii., 543) showed the mortality for lobar pneumonia among the troops at Aldershot, during the war, to be only 10 per cent. Here the patients were mostly young, selected men, and they were immediately removed to hospital on falling sick. In France during the same period A. Malloch and J. H. Rhea (Jour. Royal Army Med. Corps, 1918, xxxi., 300) found a general mortality of 26·1 per cent. at a base hospital, with a higher rate among cases coming long distances by convoy or hospital-train, thereby confirming the general opinion in regard to the ill-effects of transferring cases excepting for short distances and in the earliest hours of the disease.

It is interesting to compare with these figures the higher rates of mortality in America, and the variations there in accordance with the class of patient studied. The mortality at the Rockefeller Hospital, according to R. L. Cecil (Brit. Med. Jour., 1932, ii., 657), is 19·5 per cent.; at the Bellevue Hospital, draining the poor areas of the city, 35·8 per cent. Writing in 1897 Osler (see above) gave the figures for the Montreal General Hospital as 20·4 per cent. and for the Charité Hospital, New Orleans, as 38 per cent. For comparison he quoted Leech's figures for British hospitals which showed a mortality of 20 per cent. at St. Thomas's Hospital, 18·6 per cent. at St. Bartholomew's, and 27·1 per cent. at the Edinburgh Royal Infirmary.

After the period of infancy the mortality of lobar pneumonia is almost negligible until adult life. Osler quotes figures between 1·9 and 3·3 per cent. In adult life it rises steadily, with a steep peak after 50 years, and in the seventh decade it is in the neighbourhood of 70 per cent. Alcoholism, obesity, diabetes, nephritis, and a recent operation all load the scales against recovery. In the recent Guy's series quoted above a general mortality of 16 per cent. is reduced to 10 per cent. if cases so handicapped and cases with serious pneumococcal complications are excluded.

It is extremely difficult to assess the influence of treatment on mortality, but early attention and good nursing in a favourable environment and without moving must partly account for the better figures of general practice as compared with any hospital series.

Recent figures collected by the Therapeutic Trials Committee of the Medical Research Council (Brit. Med. Jour., 1934, i., 241) suggest that between the ages of 20 and 40 and employing serum of appropriate type as early as possible in the disease an appreciable reduction in mortality may be achieved. With older patients and septicæmic cases the results of serum therapy are disappointing. In childhood and the adolescent period it is seldom necessary.

PARTICULAR FACTORS

Turning to prognosis in the individual we have already recognised that youth and good environment are favourable, and poor conditions and advancing years unfavourable, and that a history of alcoholism and the presence of a chronic disease or degenerative changes are strongly adverse. Of bed-side symptoms, cyanosis is adverse, delirium by no means necessarily so. Wide extent of lung-involvement, more particularly when it is bilateral, is frequently, but not invariably, of bad import. A low and especially a falling blood pressure is unfavourable. Among the more useful prognostic observations the pulse-temperature-respiration ratio should, perhaps, be given special place. A high temperature, short of hyperpyrexia, need not be disconcerting. Where parallelism between the curves of temperature, pulse, and respiration-rate is maintained or pulse and respirations are low in proportion to the temperature, the auguries may be considered good. A falling temperature with a rising pulse and respiration-rate is definitely unfavourable. A moist tongue, easily won sleep, and well-taken nourishment are encouraging signs. Restlessness and insomnia are unfavourable. A high leucocyte count in the neighbourhood of 20,000 cells per c.mm. is generally favourable, and a failure of leucocytosis unfavourable, but, useful as it is, no absolute reliance should be

placed on this single prognostic test, and with intermediate figures the contribution of other clinical signs is more to be trusted. When the leucocytes range very high, say in the neighbourhood of 30,000 cells per c.mm., the likelihood of empyema must be kept in view. In a certain proportion of cases the pneumococcus can be grown from the blood stream; this finding is not necessarily adverse, but it may indicate a septicæmic state, in which event prognosis is definitely bad.

Certain *complications* are of greater gravity than others. Empyema developing after the crisis and beyond the period of infancy has a favourable outlook. Empyema in infancy and syn-pneumonic empyema give a high mortality. Pericarditis and meningitis usually foretell a fatal termination, but occasional recoveries are recorded.

Prognosis is especially difficult during the first two or three days of the disease, the very stage at which an accurate forecast is most desirable. In this phase we must needs rely chiefly upon our knowledge of the patient's age, type, habits, and antecedents. Osler's dictum that "the toxæmia outweighs all other elements in the prognosis of pneumonia" remains sound, and yet the assessment of the degree of the toxæmia, as apart from the effects of fever, extent of lung-involvement, fatigue, and dehydration, may tax the most experienced and physicianly mind. The aspect of the patient, the state of his skin, the state of the capillary circulation, and the "quality" of the pulse, difficult though they be to record or describe, here lend their quota to aid maturer judgments.

CONCLUSION

In summary, a good prognosis may generally be offered with some confidence in the childhood and adolescent period. Up to and above 50 the chances of death or recovery gradually become more evenly balanced; in the fifth and sixth decades the recovery-rate is in the neighbourhood of 60 per cent. After 70 years the chances of recovery fall to nearly one in four. The lean patient has a better prospect than the stout, the temperate than the intemperate. The pulse-temperature-respiration ratio and the leucocyte count taken in conjunction with other clinical signs have distinct value in prognosis. The knowledge that the disease runs a natural course but little swayed by therapeutics does not justify inaction, for it cannot be doubted that good management, without undue interference, and with or without specific aids, continues to save lives.

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SPECIAL ARTICLES

A PROVISIONAL STABLE STANDARD FOR ANTIPNEUMOCOCCUS SERUM, TYPE II.

AND ITS PRACTICAL APPLICATION

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THROUGH the generosity of Dr. Lloyd D. Felton, of the Harvard University Medical School, workers in different countries have been provided with a liquid bivalent antipneumococcus serum, F. 146, by means of which the type I. and type II. antibody content of antipneumococcus sera have been assayed. Felton assigned unit values to his serum, F. 146, and laboratory workers and physicians have become accustomed to the units which he proposed. In view of the fact that the serum, F. 146, is a liquid and, therefore, cannot be expected to retain its potency indefinitely, and since further supplies are no longer available for distribution, it is clearly desirable to give greater permanence and stability to the standards and units for these pneumococcus antibodies. To this end, a dry stable standard for antipneumococcus serum, type I., was prepared in this institute (Hartley et al., 1933) and assayed, as accurately as the methods at present available allow, in terms of the type I. component of the liquid serum F. 146; it was established that 0·0886 mg. of the dry stable standard for antipneumococcus serum, type I., is equivalent to the unit for this antibody as originally proposed by Felton.

The present report concerns the preparation and assay of a dry stable standard for antipneumococcus serum type II. The work has proceeded on lines similar to those followed for the preparation of the standard for type I., and with similar objects. The dry standard for type II. has been assayed in terms of the type II. component of the liquid serum, F. 146. We understand (1933) that serum F. 146 is held to contain 200 units of type II. antibody per c.cm.; on the basis of this unitage, 0·0894 mg. of the dry stable standard which we have prepared is equivalent to the unit originally proposed by Felton for the type II. pneumococcus antibody.

Preparation and Properties of the Dry Standard

The dry standard was prepared from a monovalent type II. antipneumococcus horse serum. Preliminary tests showed that the serum possessed high protective potency, and a high precipitation titre for the homologous specific soluble substance. Five cubic centimetre quantities of the serum were delivered, by means of a precision distribution apparatus, into a series of dry sterilised ampoules, dried to constant weight and sealed, the procedure followed being exactly similar to that described in the preparation of the dry stable standard for the type I. antibody (Hartley et al., 1933). The whole of the ampoules, amounting to 160 in all, are stored continuously in the dark at −2° C. to −4° C.

The sterility of the product was shown by aerobic and anaerobic cultural tests made on ampoules selected at random both before and after desiccation. The weight of the total solids in fourteen ampoules, selected at random, were found to be 0·4473 g.; 0·4473 g.; 0·4488 g.; 0·4476 g.; 0·4488 g.; 0·4489 g.; 0·4489 g.; 0·4507 g.; 0·4501 g.; 0·4487 g.; 0·4461 g.; 0·4492 g.; 0·4464 g.; 0·4446 g. The mean weight is, therefore, 0·4482 g.

The dried serum is reconstructed for use in exactly the same way as for the type I. standard, by the addition of 5 c.cm. of sterile distilled water to the contents of each ampoule. The product does not dissolve completely, a slightly turbid solution being obtained, from which, on standing, a fine white solid

settles to the bottom of the ampoule. An attempt was made to determine the amount of insoluble material by weighing the quantities remaining undissolved in each of seven ampoules; the amount of insoluble material was found to be very small indeed, the average for the seven ampoules being 0·65 mg. For most of the tests in which the standard is used, therefore, the insoluble material may be disregarded, but, for precipitation tests, it is advisable to remove it by centrifugalisation.

A solution of the standard in 66 per cent. glycerol saline has been prepared for distribution to laboratories and institutions. Each 25 c.cm. of this solution contains the total solids of one ampoule, so that its potency is one-fifth of that of the solution of the standard when reconstructed by the addition of 5 c.cm. of sterile distilled water.

Comparison of Dry Standard and Serum from which it was Prepared

Precipitation tests, carried out on the reconstructed dry standard and the undried parent serum, indicated that desiccation had resulted in a loss of potency amounting to about 25 per cent. and the results of two separate mouse protection tests led to the same conclusion. Such a change has hitherto been unknown in this laboratory where many sera have been reduced to absolute dryness by the same method. There is no reason to suppose, however, that any further alteration will occur, since the serum has been dried to constant weight and each ampoule, before sealing, was filled with pure dry nitrogen gas and then evacuated; furthermore, the sealed ampoules are stored continuously at −2° C. to −4° C. No evidence of further change, since the preparation was completed, has been obtained in many precipitation and mouse protection tests.

Comparative Tests of Dry Standard Serum and Serum F. 146

The relative potencies of our reconstructed dry standard and serum F. 146 were compared by repeated precipitation and mouse protection tests.

(*a*) *Precipitation tests.*—The following optimal precipitation ratios (W. Smith, 1932) were obtained, using the soluble specific substance from type II. pneumococcus.

F. 146 .. .. .. = 1 : 23,000
Reconstructed dry standard = 1 : 4,500

These results suggest that the reconstructed standard is five times as potent as F. 146.

TABLE I

Summary of the results obtained in four experiments in which the standard serum was compared with serum F. 146.

Culture dose = 0·01 c.cm. in each experiment

Dose of recons. st. (c.cm.).	Dose of F. 146 or G.s. of st. (c.cm.).	Exp. 1.		Exp. 2.		Exp. 3.		Exp. 4.	
		Dry st.	F. 146.	Dry st.	F. 146.	Dry st.	F. 146.	G.s. of st.	F. 146.
0·000156	0·00078	100·0	100·0	..	..	..	..	95·0	89·5
0·0003125	0·00156	85·0	90·0	91·7	58·3	60·0	65·0	80·0	83·3
0·000625	0·003125	77·5	42·5	44·0	47·8	17·5	30·0	37·5	33·3
0·00125	0·00625	35·0	42·5	4·0	12·0	22·5	7·5	7·5	27·7
0·0025	0·0125	17·9	22·5	0	8·0	10·0	2·5	5·3	7·5
0·005	0·025	5·0	0	0	4·0	5·1	2·5	5·3	5·0
0·01	0·05	0	0	..	..	..	..	5·0	0

Recons. st. = reconstructed standard; G.s. of st. = glycerol solution of standard.
The figures represent percentage mortalities in groups of mice.

(*b*) *Mouse protection tests.*—Three separate tests were made in which serum F. 146 was compared with the reconstructed standard, and one test in which F. 146 was compared with the glycerol solution of the standard. Reference may be made to earlier work for a full description of the method of the test (W. Smith, 1932); suffice it to say here that in each experiment either five or seven doses of each serum, with 20 or 40 mice per serum dose, were employed. Following the indications given by the

TABLE II

Giving the "summed" results of the four comparative tests of the standard serum and F. 146

Dose of recons. st. (c.cm.).	Dose of F. 146 or G.s. of st. (c.cm).	Standard.		F. 146.	
		Deaths.		Deaths.	
		Number injected.	Mortality per cent.	Number injected.	Mortality per cent.
0·000156	0·00078	39/40	97·5	37/39	94·9
0·0003125	0·00156	79/104	76·0	73/102	71·6
0·000625	0·003125	64/145	44·1	53/142	37·3
0·00125	0·00625	27/145	18·6	33/141	23·4
0·0025	0·0125	13/142	9·1	15/145	10·3
0·005	0·025	4/103	3·9	3/105	2·9
0·01	0·05	1/40	2·5	0/40	0

precipitation ratios, the doses of F. 146 were five times the corresponding doses of the reconstructed standard serum, whilst in the comparison between F. 146 and the glycerol solution of the standard identical doses were used. The results of all the tests are summarised in Tables I. and II.; they indicate that serum F. 146 is equal in potency to the glycerol solution of the standard and has one-fifth the potency of the solution of the dry standard serum obtained by the addition of 5 c.cm. of sterile distilled water to the contents of one ampoule.

Application of the Dry Standard in Biological Assay

The following experiment provides an illustration of the practical application of the standard in the biological assay of antipneumococcus serum, type II. Through the courtesy of Dr. G. W. McCoy, director of the National Institute of Health, Washington, we have been supplied with a quantity of an antipneumococcus serum, P. 11, with a request that its potency should be determined in terms of the dry stable standard which we have prepared. It was stated that this serum was proposed as a tentative control serum for use in the United States, and that it contained from 150 to 200 type II. units per c.cm., thus being of approximately the same potency as serum F. 146.

TABLE III

Showing the results of a potency test of antipneumococcus serum, P. 11, in comparison with the dry standard serum

Culture dose = 0·01 c.cm. in each experiment

Recons. dry st. (c.cm.)	P. 11 (c.cm.).	Group mortality.		Mortality (per cent.).	
		St.	P. 11.	St.	P. 11.
0·000156	0·00078	40	39	100·0	98·0
0·000312	0·00156	39	38	98·0	95·0
0·000625	0·00312	33	34	82·5	85·0
0·00125	0·00625	21	14	52·5	35·0
0·0025	0·0125	7	9	17·5	22·5
0·005	0·025	2	2	5·0	5·0

A preliminary test indicated that the potency of P. 11 was about one-fifth of the potency of our reconstructed serum. A second test was then carried out in which six different doses of each serum were tested against a constant dose of virulent type II. pneumococci, 40 mice being used for each serum dose

and a total of 480 mice being used in the test. The doses of P. 11 used were five times the corresponding doses of the reconstructed dry standard. The results of the comparative tests are summarised in Table III.; they indicate that the potency of serum P. 11 is one-fifth of the potency of our reconstructed dry standard; or, expressed in terms of the unit proposed by Felton, 1 c.cm. of P. 11 contains 200 type II. units. This result, considering the limitations of the mouse-protection method of testing, is in very good agreement with the values obtained for the serum, P. 11, in other laboratories.

Discussion

The results summarised in Tables I. and II. suggest that the assay of antipneumococcus serum, type II., is less precise than the assay of type I. antiserum. In order to obtain the same order of accuracy for type II. as for type I., a wider range of serum doses and a greater number of mice may be necessary. The results also emphasise the great advantage which a satisfactory in-vitro method—if such could be evolved—would possess over the mouse protection test.

The correlation between the precipitation and mouse protection values of the type II. standard serum and the type II. component of serum F. 146 is very close. The value of the precipitation test is further exemplified by the experiments in which loss of potency during desiccation was demonstrated. We take this opportunity of stating, however, that the limitations of the precipitation test found for type I. serum assay apply equally to the case of type II. sera; there are some sera and concentrated antibody solutions which fail to show a close correlation between their precipitation and mouse protection values.

The frequent request by laboratory workers for supplies of the standard for antipneumococcus serum, type I., indicate that this standard preparation, which was made available in 1933, is already proving of practical value. There is reason to believe that a dry, stable standard for antipneumococcus serum, type II., will be similarly useful. By its use the results obtained in laboratories and hospitals throughout the world can be directly compared. Not the least of its uses is in the further study of the methods of assay of the type II. antibody which, at the present time, lack precision. Two classes of variables inherent in the mouse protection test—namely, those of the test animals and those of the living culture of pneumococci—are not easily controlled; but the variable introduced by the instability of a liquid antiserum as the standard of reference can be entirely eliminated by the use of a dry, stable standard preparation.

The definition of a unit for antipneumococcus serum, type II., has not yet been internationally adopted; it is suggested that, pending such a decision, the unit proposed by Dr. Felton should be provisionally accepted as the basis of measurement for the type II. pneumococcus antibody. One such unit is contained in 0·0896 mg. of the dry standard antipneumococcus serum type II. which we have prepared.

The standard is freely available to all workers who desire to make use of it by application to the Department of Biological Standards, the National Institute for Medical Research, London, N.W.3.

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OCCUPATIONAL THERAPY

A ONE-DAY conference on occupational therapy organised by the National Council for Mental Hygiene was held at Mansion House on July 11th. In the afternoon Sir HENRY GAUVAIN, from the chair, defined occupational therapy as "occupation carried out under direct medical control and supervision with a definite therapeutic object." It should be prescribed, he said, in the same way as medicines with regard to the requirements of the individual patient. The movement was of recent development, and in this country we were merely on the fringe of the subject. The value, both psychological and physical, of occupational treatment for all persons whose infirmities necessitated a prolonged sojourn in hospital or institutional environment was daily becoming more apparent.

IN PHYSICAL DISORDERS

Dr. J. B. MCDOUGALL, medical director of the British Legion Village, Preston Hall, gave an account of the trades and industries carried on there. The effect on the morale and general health of the men he described as amazing. Owing to the relative permanence of the patient population many highly skilled workers had been trained there, and by good organisation and good salesmanship the industries had also proved a paying proposition.

Dr. VERONICA DAWKINS, resident medical officer, Malting's Farm Sanatorium, Nayland, discussed the possibilities and limitations of occupational therapy in a sanatorium with a relatively shifting population. She laid stress on the value of handicrafts, and described a régime carefully graded according to the patients' capacity for work and exercise. In addition to handicrafts patients assisted in the utility services of the sanatorium, but all work was carefully individualised and carried out under constant medical direction.

Mr. H. J. SEDDON, medical superintendent, Royal National Orthopædic Hospital, Stanmore, stressed the importance of occupational therapy in re-educating crippled limbs, as well as its psychological effects. Controlled occupation was one of the greatest advances in therapy of modern times.

In the subsequent discussion the speaker dwelt on the value of occupation even when the period in hospital was only a few weeks.

IN MENTAL AND NERVOUS DISORDERS

In the evening, Dr. NATHAN RAW presiding, the discussion centred round occupational therapy for patients with mental and functional nervous disorders. Mrs. ELEANOR SLAGLE, secretary and founder of the American Occupational Therapy Association, said that this organisation has official recognition, and supplies trained workers to all the principal Government institutions for mental illness and mental defect in the State of New York. It also supplies workers to mental hospitals and defective colonies in numerous other States. Workers properly trained on a definite syllabus were needed; the half trained were of little use. The course in her school took two years, and included not only training in handicrafts but practical experience in their application. A considerable proportion of the nurses should have sufficient knowledge to supplement and assist the work in the wards, and, since the coöperation of the nursing staff was essential, nurses in America were given a short course of special training

in occupational therapy. In the schizophrenic type of patient whose habits had deteriorated and who, if left alone would sit silent and unoccupied, slowly dementing, the value of habit training and the reawakening of interest produced by supervised occupation could hardly be over-estimated. She was convinced that treatment which brought each patient into contact with reality and obliged him to attempt to live a life approximating to the normal was a valuable weapon in mental treatment.

Dr. J. R. REES, medical director of the Institute of Medical Psychology, said how greatly he had been impressed by the occupational therapy organised in American mental hospitals. It was proposed to start a school of occupational therapy in connexion with his institute. He was convinced of the value of handicrafts in the treatment of the psychoneuroses, even for out-patients.

Dr. ELIZABETH CASSON, medical director, Dorset House School of Occupational Therapy, Clifton, described the régime at her school which was connected with a home for patients suffering from functional nervous disorders, so that students were enabled to study the therapeutic application of handicrafts there, as well as in the local mental hospitals. She was convinced of the immense therapeutic value of a time-table of exercise, occupation, amusement, and rest in the treatment both of the psychoses and psychoneuroses. Nothing was worse for patients than to drift about aimlessly. A modification of the Dutch and American types of occupational therapy would probably be found best suited to English people. She was convinced that the demand for trained workers would increase as their value came to be more fully appreciated.

Dr. NORAH HAWORTH, assistant medical officer at Severalls Mental Hospital, Colchester, distinguished between the employment of handicrafts in the wards and in a special occupation centre, and occupation in the utility services of the hospitals. The latter undoubtedly had a useful place in treatment provided that the occupation was fitted to the patient and not vice versa; for example, it was quite a different matter whether a patient is drafted into the laundry because she shows a special inclination for some branch of laundry work, or because there happens to be a shortage of laundry hands. She agreed with Mrs. Slagle, who had said that plaiting and weaving made an almost universal appeal. Hospitals' committees naturally required to be convinced that money was being usefully expended. A well-organised handicraft department should become almost, if not quite, self-supporting. It was of no help to the patients to be allowed to produce sloppy and badly finished articles, but the work done should, however, be carefully suited to the capacities of the patient. If committees realised that properly organised occupation was really a therapeutic measure they would be well advised not to count the cost, as it would tend to be off-set by an improvement in the recovery-rate, and in the quietude and improved behaviour of the patients. Even acute cases could sometimes be made peaceable and happy by suitable occupation.

Miss RUTH DARWIN, a senior commissioner of the Board of Control, said that coöperation was needed from four angles: (1) the medical superintendent and his assistants; (2) visiting committees; (3) nursing staff; (4) occupation teachers. She hoped that in the near future many more medical superintendents would come to appreciate the value of occupation therapy. She was convinced that it would soon become a sine qua non of a well-conducted modern mental hospital. Occupation to be really successful must not be confined to a special room or an hour, two or three times a week, but carried on daily in the ward, and thus the nurse had an enormously important part to play. It appeared to be a psychological necessity for all humanity, whether mentally sick or mentally sound, to have some occupation with an object, and occupational therapy did not consist merely in running a needle aimlessly through a little piece of leather. If any benefit was to accrue to the patient it was essential to make him appreciate that the work must be of high enough quality to make it of real use.

MEDICINE AND THE LAW

Patient's Ambulance Journey after Childbirth

ON May 12th a patient died at Crumpsall Hospital within a few hours of having been transferred from St. Mary's Hospital, Whitworth-street, Manchester, where she had just been delivered of a child. The circumstances attracted local publicity and criticism, and a committee was appointed to investigate and report. The five members of the committee included two professors of obstetrics, Prof. Miles Phillips, of Sheffield, and Prof. W. Fletcher Shaw, of Manchester. Their report exonerates the two hospitals, and, while they disclaim any authority to generalise, it obviously touches matters of some general importance. There was fortunately no divergence between the patient's relatives and the hospital witnesses on any material question of fact. Mrs. Taylor, the patient, an insured person entitled to maternity benefit, attended on April 7th at St. Mary's Hospital, Whitworth-street, where she was examined. She paid a voluntary contribution of £2 towards the expense of her confinement (expected on May 16th) at the hospital. The printed form of acknowledgment contained the following words, apparently on the back of the document: "Important. Come immediately to the hospital as soon as labour commences. In case the hospital is full the best arrangements possible in the interests of the patient will be made." The committee's report establishes the fact that neither the patient's husband nor her mother had read this printed warning. One general conclusion to be drawn from the case is that all possible steps should be taken to bring such a warning to the careful attention of the patient and of others concerned. Mrs. Taylor's condition in April was normal and satisfactory. On May 11th she felt unwell at 1 P.M., and labour undoubtedly began, but she did not go to the hospital at once. Her mother told the committee: "I purposely kept her waiting so that they could not send her back again." Later, at 5 P.M., her mother urged her to go to the hospital but the patient was unwilling. Ultimately at 5.40 Mrs. Taylor and her mother went together by tramcar to the hospital, arriving at 6 P.M. No inquiry had been made by telephone or otherwise as to whether a bed was available. As it happened, one ward, containing one-fifth of the total beds, was closed for painting and cleaning; every bed in every available ward was occupied, and there were two emergency beds occupied in each ward. The accommodation was not only full but overcrowded. An examination of Mrs. Taylor by a house surgeon, assisted by a nurse, had indicated that labour would continue for some hours. The congestion in the hospital was explained to the patient and her mother. Mrs.

Taylor was advised that it would be best for her to go to the Crumpsall Hospital; she was quite well, she acquiesced and an ambulance was ordered. In the succeeding 20 minutes events rapidly developed, and a child was born in the room where she had been examined, a room attached to the out-patients' department. The house surgeon and an experienced resident obstetrical surgeon were promptly in attendance and, notwithstanding the precipitate nature of the confinement, the patient's condition was good. She was cheerful and appeared quite unperturbed by the idea of being removed to Crumpsall Hospital. The obstetrical surgeon satisfied himself that there was no birth injury, and that Mrs. Taylor was in a fit state to be moved. At 7.25 P.M. the ambulance took Mrs. Taylor and her child with her mother and a nurse to Crumpsall Hospital where they arrived 15 minutes later. The patient was there placed in a maternity ward; she was none the worse for the journey; the nurse went back and the patient's mother returned home. Mrs. Taylor was now continuously under observation and careful treatment. At 9 P.M. the ward sister was called to her and was surprised to find obvious signs of shock. The house surgeon saw her and advised measures which were adopted and led to some improvement, but at 2 A.M. her condition became such that her relatives were sent for; she grew worse, and she died at 4.25 A.M. The committee states that at both hospitals the treatment was prompt and efficient, and that it was not for want of proper attention that Mrs. Taylor died; there being no possible accommodation at St. Mary's Hospital, the right course was to remove the patient to Crumpsall Hospital. There has naturally been public uneasiness on the general question whether it is safe and right to move a patient, either while in labour or immediately after the birth of a child, from one place to another by ambulance. The answer given by the committee, and supported by numerous statistics from hospitals of the highest efficiency, is that such removal is frequently necessitated by various circumstances, and is usually carried out with great advantage to the patient. "We find no reason to believe that in this instance a journey lasting only 15 minutes in a first-class ambulance was in any way responsible for the death of the patient." The cause of Mrs. Taylor's death the committee finds itself unable to state with certainty. After hearing the evidence of medical witnesses and particularly that of Prof. Leyland Robinson, professor of obstetrics and gynæcology in the University of Liverpool, the committee thinks that death was due to delayed obstetric shock, a rare condition which more commonly follows difficult and prolonged than simple and unassisted labours. This condition, says the committee, does rarely occur after normal labour even in the most favourable circumstances, but there are usually warning indications of its possible advent. It would not perhaps occur to a patient to inquire by telephone if accommodation was available before going to the hospital. Had such an inquiry been made in good time in Mrs. Taylor's case, it might have been possible to arrange for her to go direct to the Crumpsall Hospital.

Sarcoptic Mange Infection

In an action heard before Mr. Justice Acton on July 10th a plaintiff claimed damages for personal injuries alleged to be due to breach of warranty on the sale of a bull-dog pup. The plaintiff's case was that the pup developed sarcoptic mange three days after the purchase and that she herself contracted the same disease a few days later. She complained also that the consequent sulphur treatment had caused dermatitis, affecting her back, chest, and face. The medical evidence included that of her own doctor who said he had diagnosed sarcoptic mange by the characteristic papillary red vesicles and the absence of burrows typical in scabies. Dr. Arthur Whitfield was also called. He estimated that he had seen a hundred cases of sarcoptic mange since the war. The disease, he said, could be contracted by human beings from cats or dogs. It might develop within six days of contact with an infected animal. It was to be distinguished from scabies by the absence of burrows. It was difficult to isolate the parasite of sarcoptic mange, though not impossible, for he had himself done so. He agreed that excessive use of sulphur would produce dermatitis, the effective amount varying with different persons. At the close of the plaintiff's case the claim was settled, the defendant paying her £100.

ROYAL COLLEGE OF SURGEONS CONVERSAZIONE

THE surgeons of England on Wednesday of last week emulated the physician's art, formulating a prescription for an evening's entertainment of which the ingredients were nicely balanced. The basis of the prescription was the incitement to further effort in research provided by the varied exhibits, some grave in pathological implication, others gay as feathers of cock and hen combined; an adjuvant was supplied by appropriate lecture-demonstrations in the theatre; the mixture was given proper form and colour by the dignity of the vehicle, the stately rooms of the College; while the whole was made palatable by a well-furnished buffet. This formed an attractive meeting-place for those whose bias for the evening was social rather than technical, and certainly was one of the most if not the most popular exhibit.

It seems unlikely that any one guest found time to visit all the demonstrations, of which nearly 50 were set out, but none could come away without an increased respect for the energy with which research, especially cancer research, is being prosecuted to-day, and for the degree of coördination achieved between the agencies for its promotion. The following exhibits and demonstrations were on view:—

Imperial Cancer Research Fund.—Effect of radium on spontaneous mammary carcinomata which differ greatly in their radiosensitivity; demonstration of the presence of reducing substances in malignant tumours; evidence for the existence of hæmopoietic and cancer-accelerating factors in liver; cancer in mice and rats induced by pinene tar which is the most potent of known carcinogenic agents; the progressive growth after transplantation of a benign tumour of the rat; the technique of micro-incineration—the burning out of the organic compounds in sections of tissues at high temperatures.

Strangeways Research Laboratory, Cambridge.—The control of growth in tissue cultures by radiation; the effect of gamma rays on the whole embryo chick; experiments on wound-healing in vitro.

Stroud Laboratories, Mill Hill (Imperial Cancer Research Fund).—Growth and spread of filtrable tumours of the fowl; living cultures of normal and malignant cells under dark-ground illumination and after vital staining.

Research Institute of the Cancer Hospital (Free).—Microscopic specimens illustrating the development of carcinoma of the mamma in a castrated male mouse under the influence of œstrin; specimens of cancer-producing pure chemical compounds all being of the same chemical type and all but one derived from the parent hydrocarbon, 1:2-benzan-

thracene; specimens illustrating the application of fluorescence spectroscopy to the isolation of the active substance present in a cancer-producing material of industrial importance—namely, pitch.

Middlesex Hospital Research Laboratories.—Filtrable tar-induced tumours of the fowl; the action of synthetic œstrogenic and synthetic carcinogenic compounds (in association with the Research Institute of the Cancer Hospital (Free).)

Other exhibits were set out by various departments of the College and the Buckston Browne Surgical Research Farm. These included books and manuscripts illustrating the history of cancer and cancer research from 1589 onwards; reconstructions from the fragments of the skull of Piltdown man; demonstration of fossil and other prehistoric human remains, specimens of experimental and clinical work on thoracic surgery, surgical shock, and dilatation of the œsophagus and teratomata; and a new technique for dealing with paralysis of the facial nerve in man. The National Institute for Medical Research showed simple and sensitive methods for detecting the presence of acetycholine in body fluids; also some of the appliances now in use for photographing virus bodies with ultra-violet light as the invisible illuminant. St. Bartholomew's Hospital Surgical Unit showed arteriograms following injection of thorotrast; drawings illustrating the effects of irradiation on cancer of the tongue; radiograms of various types of diaphragmatic herniæ and diagrams and drawings illustrating hyperparathyroidism and Raynaud's disease. The department of physics of this hospital exhibited a new type of radiation detector, and demonstrated a newly discovered chemical effect of radiation. The anatomy department of St. Thomas's Hospital Medical School showed how retinal localisation, sharply defined, in the lateral geniculate body had been established in monkeys.

THEATRE DEMONSTRATIONS

In the course of the evening two theatre demonstrations were given to very large audiences. Dr. J. A. Murray, F.R.S., showed as a film a moving diagram of the mode of local extension of skin cancer. The initial focus is small and grows from its own resources. Extension may be by fusion of adjacent independent foci. If these develop at intervals at the periphery during the growth of a slowly growing tumour, the impression of a continuous transformation at the margins of a growing cancer may be produced. Prof. John Cunningham McLennan, F.R.S., demonstrated various aspects of the work in progress in connexion with beam therapy research at the Radium Institute.

BEIT MEMORIAL TRUST FOR MEDICAL RESEARCH

A MEETING of the Trustees of the Beit Memorial Fellowships for Medical Research was held on July 12th for the election of Fellows and other business.

The Trustees expressed their deep regret at the death on July 3rd, at the age of 82, of their senior colleague, Sir James Kingston Fowler. For 21 years in his double capacity of trustee and hon. secretary Sir James had given devoted service to the welfare of the Trust, and when enfeebled health made it necessary for him to relinquish the secretarial duties he still watched closely as trustee the progress of the work which owed so much of its success and even of its existence to his creative powers. His eager care in fostering the aims of the Trust rivalled that of the founder himself, Sir Otto Beit, during the 20 years in which the latter lived to preside as chairman of the trustees.

Fellowships through the year 1933–34 were held by 24 workers. Among the distinctions gained by past and present Fellows during the year were the appointment of Prof. E. Mellanby, F.R.S., as secretary of the Medical Research Council, and Dr. Henry Cohen to the chair of medicine in the University of Liverpool. Dr. Helen Mackay was elected to the Fellowship of the Royal College of Physicians of London, being the first woman to be thus honoured. Dr. Dorothy Russell gained the Hunter medal and triennial prize of the Royal College of Surgeons of England, and Dr. Janet Vaughan the triennial Liddle prize of the London Hospital. Dr. Maurice Stacey earned an unusual distinction as first year Fellow in being awarded the Meldola prize of the Institute of Chemistry.

The following elections to Fellowships were made :—

Fourth Year Fellowships

ROBERT HILL, M.A. Camb. To continue his research on the properties of hæmoglobin and cytochrome. At the Dunn Institute of Biochemistry and Molteno Institute, University of Cambridge.

LEONARD HUBERT STICKLAND, M.A., Ph.D. Camb. To continue work on the metabolism of the strictly anaerobic bacteria of the genus Clostridium. At the Dunn Institute of Biochemistry, University of Cambridge.

Junior Fellowships

SOLLY ZUCKERMAN, D.Sc. Lond., M.R.C.S. Eng. Rockefeller Research Fellow, Yale University, 1933–34. Proposed research: Experimental study in animals of the neurovascular control of reproductive functions. At the Department of Human Anatomy, University of Oxford.

HAROLD WILLIAMS FULLERTON, M.B. Aberd. Rockefeller Research Fellowship, Boston, U.S.A., 1933–34. Proposed research: The ætiology and treatment of hypochromic anæmia of women of the poor classes. At the Department of Medicine, University of Aberdeen, and the Rowett Research Institute, Aberdeen.

EMANUEL MANNIE LOURIE, M.B. Lond., D.P.H., D.T.M. & H. Eng. Rockefeller Research Fellow, University of Chicago, 1931–33. Proposed research: Studies on chemotherapy in protozoal disease. At the Liverpool School of Tropical Medicine.

JOSEPH STANLEY MITCHELL, 1st class Parts I. and II. Natural Science Tripos; M.B. Camb. Queen's Scholar, Birmingham University, 1932. Proposed research: The effects of radiation on thin protein films At the Laboratory of Colloid Sciences, University of Cambridge.

DAVID EZRA GREEN, M.S. New York, Ph.D. Camb. Research Student at Cambridge. Proposed research: The effect of hormones and vitamins upon the metabolism of individual organs. At the Institute of Biochemistry, University of Cambridge.

GORDON ALLISON GRANT, M.Sc. Dalhousie, Ph. D. Toronto. Royal Society of Canada Research Fellow, at Lister Institute, London, 1933–34. Proposed research: The metabolism of galactose and the physiological synthesis of lactose by the active mammary gland. At the Lister Institute of Preventive Medicine, London.

STUART LAWSON COWAN, B.Sc. Lond. Research worker, Department of Pharmacology, University College, London, 1932–34. Proposed research: To continue study of the chemical exchanges occurring in crustacean nerve, as a result of stimulation and oxygen want: to study the blood flow through the kidney during diuresis. At the Pharmacology Laboratories, University of Cambridge.

MAURICE JOWETT, B.Sc., Ph.D. Liverp. Assistant Research Chemist, Biochemical Laboratory, Cardiff City Mental Hospital, 1932–34. Proposed research: Metabolism of the central nervous system with reference to the effects of narcotic and basic amines in cases of mental

disorder. At the Biochemical Laboratory, Cardiff City Mental Hospital.

The value of a fourth year Fellowship is £500 per annum, and of a junior Fellowship £400 per annum.

In considering candidates for election this year the Trustees were influenced by a special desire to promote research in relationship to mental disease.

All correspondence of Fellows and candidates should be addressed to Prof. T. R. Elliott, M.D., F.R.S., Honorary Secretary, Beit Memorial Fellowships, University College Hospital Medical School, University-street, London W.C.1.

BUCHAREST

(FROM OUR OWN CORRESPONDENT)

DELINQUENCY AND DISCIPLINE

THE recent increase of juvenile crime in Rumania—cases of manslaughter and burglary committed by boys of secondary school age are reported—has prompted the Minister of Education to issue strict regulations regarding the control and upbringing of school-children. It has been made compulsory for them to wear uniforms, and they are also all to be numbered. Visits to cinemas have been prohibited, and they may only attend the theatre with the approval of their teacher. The Chamber of Deputies has passed a law making it compulsory for youths between the ages of 18 and 20 to take part in special military drills, which it is hoped will cultivate in them a love of order and discipline besides promoting their physical well-being. The drills will take place on Sundays and holidays, and may serve to occupy spare time which might otherwise be spent in unsuitable pastimes. Fifty drills will be held in the year, and manœuvres, lasting from 4–7 days, will take place in special camps. Badges will be awarded for proficiency, and records of attendance and progress will be kept. Parents of children who take part in the drills will be exempt from certain taxes, and two years' attendance will secure a six months' curtailment of the usual term of military service (20–36 months). Those who are not physically fit enough to attend the drills must produce a doctor's certificate, and those who absent themselves without permission will be punished by two days' hard labour for the benefit of the parish, and a fine of approximately 4*s*. which will be paid into the fund for the drills.

NEW HEALTH INSURANCE BILL

As the law stands at present any employee who is incapacitated either through illness or by an accident may claim sick benefit for six weeks no matter how many years he has been employed. A Bill has recently been put before the Chamber of Deputies which proposes that ten years' employment shall entitle the employee to eight weeks' benefit, and every further five years' employment to a further week's benefit. Thus after 30 years' employment 12 weeks' benefit may be claimed. The employee will also be entitled to a further two weeks' sick leave without pay during which time his position must not be filled and he cannot be given notice. After two years' employment maternity benefit is to be paid. An insured person who loses his employment will still be eligible for benefits for a quarter of the total period over which he has paid contributions, with a minimum of 24 months. According to present regulations the period is fixed at 30 months. The new system has been in force in Czechoslovakia for some time, where it is found to work well. Another suggested innovation is that contributors of ten years' standing, who lose their jobs at the age of 55, should, after 12 years' unemployment, automatically become eligible for the old-age pension, while for women the age limit is to be 54.

MOVEMENT AGAINST FOREIGN QUALIFICATIONS

The association of medical students of the University of Cluj, the capital of Transylvania, have presented a memorandum to M. Tatarescu, the premier, stating that graduates of the Rumanian universities find it difficult to obtain posts, as preference is given to doctors who go to study at Austrian, Hungarian, and Italian universities, where they receive degrees which are marked "valid for the Orient." The students appeal to the Government to give preference to graduates from Rumanian universities.

TUBERCULOSIS

The Minister of Health has introduced a Bill which outlines the organisation of a league against tuberculosis. The measures suggested include an energetic campaign against bad hygienic conditions which favour the spread of tuberculosis; the co-ordination of existing institutions; the organisation of antituberculous inoculation; propaganda and public education; the training of physicians and nurses; the establishment of dispensaries, isolation hospitals, sanatoriums, and so forth. All such institutions must be approved by the council of the league which controls all such institutions. The council of the league consists of six members who are elected for five years. The league receives the larger part of its income from the Ministry of Health, which in turn acquires it from duties on drugs, cosmetics, proprietary medicine, narcotics, State monopolies and lotteries, and the tax on alcohol. It is expected that the Bill will become law before the Chamber adjourns, and the league will thus be able to begin its work in August or September.

HOUSING CONDITIONS IN BUCHAREST

In reply to a question in the Chamber of Deputies, it was recently stated that in Bucharest there are 30,000 dwellings where 3–5 persons share one room, 13,500 where 6–10 persons share one room, and 1357 dwellings where more than ten persons live in one room. Ten per cent. of the population have a bed each, 36 per cent. sleep 2 in a bed, 27 per cent. 3 in a bed, 11 per cent. 4 in a bed, 3 per cent. 6 in a bed, and 2 per cent. 7–8 in a bed. In Rumania there are 40,500 underground dwellings and 661,400 one-roomed dwellings, most of which have windows pasted up with cardboard to keep the house warm in winter and cool in summer, and about 1,000,000 houses have floors of earth. The hygienic conditions are said to be good in only 4 of the 72 counties, in 21 they are satisfactory, while the rest are described as unsatisfactory. Owing to lack of accommodation it is possible to isolate only 20 per cent. of the patients suffering from infectious diseases. Though the law governing public health prescribes that every county should allot a certain sum from its budget for public health purposes, in the counties of Dolj, Mehedint, and Romanati not one penny is assigned to this work.

WESTMINSTER HOSPITAL.—Dr. Adolphe Abrahams has been elected dean of the medical school in succession to Sir Stanley Woodwark.

CORRESPONDENCE

THE STUDY OF CLIMATE

To the Editor of THE LANCET

SIR,—At the conference of the British Health Resorts Association two weeks ago pleas were put forward for a closer study of climate from a scientific aspect. The information which this society is collecting with regard to the special features and therapeutic value of the various spas and resorts will no doubt provide knowledge which should prove of practical value to doctors and the public. This is a step in the right direction, but it is not enough, for the information thus obtained can only be of a rather vague and general nature and unless fortified by scientific observation on the spot, whether it be spa or health resort, there can be but little hope of our being able to make detailed statements on the value of climate.

The rôle of climate in the study of disease has not to my mind been fully appreciated. It is often assumed that because people do not exhibit violent reactions to the sun, change of wind, change of humidity, &c., which sensitive subjects do, that no responsive changes are taking place via their skin and mucous membranes, which have an effect on their metabolism.

You suggested last year in a leading article on the More Exact Study of Climate (1933, ii., 546) that "human sensitiveness to physical surroundings especially in ill-health, surpass that of any instrument." If this fact were realised and accepted as true it would perhaps encourage our profession to take the real interest in the subject which it surely deserves. The human being, like the rest of the animal kingdom, is born with certain potentialities, some with strong vitality, some with weak, some with perfect mechanism, others with structural weakness, and all alike are subject from the moment of birth (and, of course, remotely before this "in utero") to the effect of environment—i.e., to food and atmospheric conditions.

Surely on ordinary reasoning climate and diet should take the first place in any scheme of research. Much attention has been given, and rightly, to the study of organisms and the gross morbid anatomy of disease, but so little encouragement has been given to investigating or teaching on the earlier important phases of disease when prevention may be possible. As educated doctors we cannot be content indefinitely with mere statements that some climates are relaxing and some bracing, some suit asthmatics, and others rheumatism; we want to try and establish why; and until the study of reactions of individuals to changes in climate as regards temperature, humidity, salt content, and ionisation of atmosphere, is attempted no answer will be forthcoming. Is it too much to hope that money will be forthcoming for clinical research on these essential problems?

Now is the opportunity for coördinating effort on the research side with the British Health Resorts Association. It should be possible, if the importance of this subject were once accepted by the profession at large, to make a start by establishing units, or teams, which include clinician, climatologist, and laboratory workers at one or two spas, and at, say, several sea coast resorts with divergent climatic conditions—e.g., Norfolk and Cornwall. Clinical material of the kind required is abundant—i.e., in convalescent homes

Such ideas have, I know, already been put forward, but they do not seem to be coming to fruition. I write, therefore, to urge the continued interest of your journal in this subject, and to help to press its claims as a subject worthy of accurate scientific observation in the relation to health and disease.

I am, Sir, yours faithfully,

Brook-street, W., July 12th. WILFRED J. PEARSON.

THE TREATMENT OF SCHISTOSOMIASIS AND ANKYLOSTOMIASIS WITH ACRIFLAVINE

To the Editor of THE LANCET

SIR,—Mr. Fisher's note on the treatment of schistosomiasis with acriflavine, which appeared in THE LANCET of April 28th, has made a noticeable move in the medical centres in Egypt. Egypt is one of the countries in which two types of schistosomiasis are common—i.e., *Schistosoma hæmatobium* and *Schistosoma mansoni*—the first being common in Upper Egypt, Cairo included, and the latter being more common in the Delta (Lower Egypt). The course of treatment suggested by Mr. Fisher is very simple, as it shortens the course to five days instead of one month under the tartar emetic treatment, and of three weeks under "Fouadin" treatment; it has the added advantage of doing away with intravenous and intramuscular injections.

Trials have been made by myself to test the effect of acriflavine on *Schistosoma hæmatobium* infection in Cairo.

Twelve cases were selected: 2 adult males, 6 boys, 1 adult female, and 3 girls. Of these cases 11 were infected with *Schistosoma hæmatobium* ova in the urine, and only one case, a girl of 11 years, had *Schistosoma mansoni* ova in the stools. The solution of Trypaflavine (acriflavine) was given according to Mr. Fisher's scale, and a dose of magnesium sulphate was given three hours after the trypaflavine.

After five doses given on five consecutive days, the examination of the excreta of the 12 cases showed the presence of abundant schistosoma ova with no alteration in the viability of the embryo. The hatching time of ova was done before and after treatment, under the same conditions, and showed no alteration. One cubic centimetre of the sediment of the urine was added to 60 c.cm. of fresh water at 50° C., and the hatching of ova observed. The hatching time after the five consecutive doses was made three days after the last dose. This was done purposely. If the hatching time test is done immediately after the last dose, while the trypaflavine is still being excreted in the urine, there will be the possibility that a long hatching time is due to the presence of trypaflavine in the urine and its effect on the ova in the bladder; simply as occurs when adding trypaflavine to an infected urine in a test-tube. Usually excretion of the stain in the urine and stools begins in about one hour after the first dose in children, and after about one and a half hours in adults, and is complete in about 48 hours after the last dose, except in children who receive a proportionally larger dose, where excretion is complete in a slightly longer time.

The only benefit of the treatment was symptomatic. The irritation in passing urine and the hæmaturia were markedly diminished. Five cases out of the 11 urinary cases were suffering much from symptoms of cystitis and hæmaturia, and all of them were relieved by the treatment, but the urine was still strongly positive for ova. My final conclusion as regards the trypaflavine treatment in urinary schistosomiasis is that it is useless as a curative agent but it ameliorates the symptoms of cystitis.

Six patients of the 12 mentioned before were positive for ankylostoma ova in the stools. By a good chance I noticed that repeated examination of the stools after the course of trypaflavine treatment did not show any ankylostoma ova in the stools except in one case in which it was positive after the fourth examination. This shows that trypaflavine is effective in treating ankylostoma. Even the positive case mentioned was only positive after the fourth examination, showing that the number of ankylostomes in the intestine was much reduced. Other cases of ankylostoma infection were selected for trial. Up till now 10 cases in all have been given the trypaflavine treatment; 6 were given 5 doses each on 5 consecutive days, and 5 out of these were negative after repeated examinations. Two were given 2 doses each in 2 consecutive days and their stools were persistently negative. One was given 1 dose and was found negative and 1 with a very heavy infection was given 4 doses on 4 consecutive days and was still positive. So this gives a rate of 2 failures in 10 cases; a very promising result. Upon other worms—e.g., ascaris, oxyuris, &c.—which happened to be present with ankylostoma the results were not satisfying. Now trials are being made to estimate the proper dose and number of doses necessary for treating ankylostoma.

This letter is only intended as a preliminary note, for further investigations upon the subject will be made.—I am, Sir, yours faithfully,

A. FAKHRY, M.B. Cairo,
P.M.O., Bilharzia and Ankylostoma Hospital (Shoubra), Cairo.

July 9th.

SPECIFIC SUPERSENSITIVENESS

To the Editor of THE LANCET

SIR,—Drs. Grant and Scott, in discussing the case of acute serum shock that they report in your columns last week, bring forward evidence that natural supersensitiveness is not specific. The same syndrome of collapse resembling anaphylactic shock—cough, sudden syncope, cyanosis, and feeble pulse—has been reported twice after intravenous injection of quinine-urethane for varicose veins,[1 2] and both patients gave a positive skin reaction to quinine when subsequently tested. Many thousands of quinine injections must have been given up to date, but only these two cases of collapse have reached the literature. A much larger proportion of patients, however, are sensitive to quinine taken by mouth or applied topically. Bram, while developing his quinine-tolerance test for hyperthyroidism, found 4 patients out of 500 who developed erythemata.[3] Local dermatitis after the use of after-shave lotion containing quinine has been noted in about ½ per cent. of those indulging in this luxury.[4] And cases of urticaria and sneezing have been frequently reported after the use of quinine. These non-specific reactions lend support to Prof. Topley's claim[5] that drug idiosyncrasies are manifested by a symptom-complex, bearing no relation to the substance evoking it. It has been shown that many of the skin eruptions and the coryza following the exhibition of quinine can be avoided by using the dextro-rotatory isomers.[6] This is not the whole story, however, for a certain number of persons are sensitive in a different way to quinine; they do not react in the non-specific allergic manner, but develop the distinctive toxic picture of the drug—tinnitus, deafness, restriction of the field of vision, and labyrinthitis—with an unusually small dose.

Supersensitiveness, to drugs at any rate, must be classified into two groups: one, the non-specific allergic syndrome, including the rare cases of anaphylaxis which appear to follow parenteral therapy; the other, the "specific" syndrome, which manifests the specific selective action on the tissues characteristic of the drug in question.

I am, Sir, yours faithfully,

Bristol, July 13th. FRANK BODMAN.

[1] Cruickshank, A. G.: Brit. Med. Jour., 1929, i., 104.
[2] Gray, St. G. B. D.: Ibid., 1929, i., 200.
[3] Bram, I.: Arch. Internal Med., 1928, xlii., 53.
[4] Burgess, J. F., and Usher, B.: Canad. Med. Assoc. Jour., 1930, xxiii., 45.
[5] Topley, W. W. C.: Outline of Immunity, London, 1933.
[6] Fletcher, W., and Travers, E. A. O.: Brit. Med. Jour., 1923, i., 629.

THROAT AFFECTIONS AND THE O.T.C. CAMPS

To the Editor of THE LANCET

SIR,—On July 30th the various Officers' Training Corps will commence a ten days' camp round Aldershot. In view of the numerous septic throats which have been prevalent during the droughts of the recent winter and the present summer, would it not be a wise precaution if the authorities arranged for a morning and evening "gargle" parade? This could be very easily done, especially by means of perborate of soda which is a most efficacious and harmless agent. All those who have served in camps in the neighbourhood of Aldershot know well the irritating and infective dust encountered there.

I am, Sir, yours faithfully,

Harley-street, W., July 14th. MACLEOD YEARSLEY.

URTICARIA FROM BEE-STINGS AND FISH-POISONING

To the Editor of THE LANCET

SIR,—Two sisters who kept bees, instead of acquiring immunity to the poison, became highly sensitised. The younger, aged 27, first had charge of the bees and was often stung, but only slight local irritation ensued, which soon passed off. Then towards the end of the second season she had two violent attacks following bee-stings. About 15 minutes after being stung intense urticaria started all over the body, including head and limbs, accompanied by a feeling of serious illness, fainting, and collapse. A doctor was called on the second occasion, and on his advice she kept away from the bees.

The elder sister then took charge and, apart from trivial local irritation, bee-stings had no unpleasant effect during the first two years. About mid-season of 1932 a very serious attack occurred, said to be due either to food-poisoning or to a bee-sting, or to both combined. The bees were avoided for the rest of that year and during 1933. She took charge of them again in April, 1934, and had one sting on a leg, about mid-May, with only slight local effect.

Three bee-stings on May 30th (two on left hand and one on left leg) were followed within 20 minutes by intense urticaria from head to foot. Irritation began on the scalp and spread rapidly, accompanied by a "terrible cough," and much cardiac and mental distress. She took two tablets of calcium sodium lactate powdered in water when the irritation began. But as the general condition continued to get worse, 1 oz. of Phillip's milk of magnesia was given in some water. Very marked relief of the intolerable itching, and of the cough, cardiac, and mental distress began within five minutes after taking the magnesia. She was quite comfortable two hours later and slept well. There was slight œdema of the dorsum of the

left hand on the next morning. The second bee-keeper has decided to abandon the apiary.

She had also urticaria 10 or 15 minutes after eating dried haddock early in May. This attack was promptly cut short by a tablet of calcium sodium lactate and a tablespoonful of Phillip's milk of magnesia. It seems that magnesia acted as an antidote, and may be worth further trial.

I am, Sir, yours faithfully,

Norwich, June 7th. ALLAN EDWARD MAHOOD.

PELLAGRA IN SUDANESE MILLET-EATERS

To the Editor of THE LANCET

SIR,—I was interested to read Dr. N. L. Corkill's article on this subject in THE LANCET of June 30th, In Egypt, where many negroes live, they are rarely affected with this disease, although one very occasionally sees such a case. This may be due to the fact that they do not work in the fields, most of them being domestic servants in towns, partaking of the healthy diet of their employers without being exposed to any parasitic infestation. Prof. A. G. Biggam and I have pointed out (THE LANCET, 1933, ii., 1198) the relative frequency of such infestation in these patients and expressed the belief that, together with dietary deficiency, it probably played a rôle in the production of the syndrome. Whatever factor or factors be absent, be it vitamin B, or protein of high biological value, or vitamins A, D, and C, as well as cholesterol, as Dr. Corkill suggests, it is probable that one should look upon this disease as a syndrome that could be produced in one or more of the following ways:—

(1) The "P" factor may be absent in the diet: Sudanese pellagra, certain cases of Egyptian pellagra, pellagra following dietetic treatment of gastric ulcer.

(2) The "P" factor is present in the diet, but is either destroyed in the gut or through intestinal hurry, unabsorbed—e.g., pellagra following chronic diarrhœa, extensive intestinal resection, chronic alcoholism, helminthic infestation.

The latter can act in several ways: severe and untractable diarrhœa can be set up as in intestinal schistosomiasis or intestinal worms, may interfere with digestion and absorption and possibly destroy vital factors. An example of this action is seen in the interference in some way or other with the Addisonian hæmopoietic factor in diphyllobothrium infestation.

Rickety manifestations can be produced by a vitamin-D deficient diet or by malabsorption of ingested vitamin in cœliac disease; pernicious anæmia by lack of certain extrinsic dietary factors (tropical macrocytic anæmia), lack of an intrinsic factor, or interference with the absorption or destruction of the necessary factor (extensive intestinal resection, &c.). Thus the above view of the causation of pellagra only brings it in line with other recognised deficiency diseases.

It remains only to point out that whilst vitamin-A deficiency would seem to be a reasonable suggestion in view of the known experimental results of such deficiency on the mucous membranes and skin, this vitamin is usually associated with vitamin D in nature, and no deficiency of the latter vitamin could be observed in our cases. In fact, whilst rickets is a common disease in the poorer *urban* districts of Egypt, where pellagra is uncommon, it is rare in the *rural* districts where pellagra thrives. Similarly, no scorbutic symptoms have ever been noticed. It is not clear whether it is suggested that there is any relation between the "proverbially good" teeth of the modern Egyptians and the fact that "most of them are pellagrins" (which statement is far from the truth). If so, this would be a sign that they synthesise or ingest more vitamin D than the average and pellagra could not well be ascribed to vitamin-D deficiency.

I am, Sir, yours faithfully,

PAUL GHALIOUNGUI, M.D., M.R.C.P.

Faculty of Medicine, Cairo, July 5th.

NEW METHOD OF ANÆSTHESIA FOR ABDOMINAL OPERATIONS

To the Editor of THE LANCET

SIR,—My attention has only just been drawn to Dr. M. Baruch's letter in your issue of June 23rd regarding my article on New Method of Local Anæsthesia for Abdominal Operations.

I began my experiments with this method in 1930 at the Bamberg surgical clinic, in the department of Prof. Lobenhoffer. I tried anæsthetics other than Novocain, and I agree with Dr. Baruch that Percaine (Nupercain) is a better abdominal anæsthetic than Novocain; but the former being very toxic even a small dose of 0·01 to 0·05 per cent. solution may produce shock, and the resulting paralysis of the intestine may be difficult to overcome. I continued my experiments systematically up to the publication of my paper, without knowing that Dr. Baruch had preceded me in this field. I gladly yield him priority—I am not so much concerned with the question of priority—but wished to bring to the attention of surgeons in this country a method of abdominal anæsthesia which is simple, effective, safe, and believed new.

As an enthusiastic supporter of local anæsthesia, I think also that a new, less toxic vehicle, such as Metycaine, which seems to have excellent advantages according to Dr. Baruch, should be adopted universally.

I am, Sir, yours faithfully,

Manchester, July 12th. G. BANKOFF.

HISTAMINE IN RHEUMATISM

To the Editor of THE LANCET

SIR,—In a letter appearing in your issue of June 23rd last Dr. Bisset comments on our paper on Histamine in Rheumatism (THE LANCET, June 9th, p. 1226). He criticises the section dealing with ionisation on the grounds that we "were unable to obtain any clinical evidence of the characteristic histamine effect by ionisation methods." If he refers to our paper, however, he will see that characteristic histamine effects were both recognised and recorded.

We are, Sir, yours faithfully,

CYRIL G. EASTWOOD,
B. SHANSON.

School of Medicine, Leeds, July 10th.

ROYAL VICTORIA INFIRMARY, NEWCASTLE-UPON-TYNE.—In 1933 this hospital admitted 12,842 in-patients, whose average stay was 15·8 days, a reduction of nearly a day. There were 110,768 out-patients, and 19,623 cases of accident. By the opening of a new orthopædic block, and the heightening of two pavilions, the number of beds on the voluntary side of the hospital is now 645. This addition will entail an additional annual expenditure of £7000. The committee are "gravely concerned" at a waiting-list of nearly 2000, and hope that the new beds will help to reduce the number. The hospital tended 1108 sufferers from motor accidents, 416 of whom were in-patients. These intern cases cost £2413, of which £444 was recovered from the insurance companies. On an average only 30 per cent. of the accounts sent in have been paid by the companies.

PUBLIC HEALTH

The Drought

A FURTHER meeting of the Water Supplies Emergency Conference was held at the Ministry of Health on July 11th when the general situation was reviewed. As regards the larger water undertakings it was reported that serious trouble is unlikely to arise, provided reasonable economy is continued and the utilisation of additional sources of supply is further developed where necessary. Inquiries addressed to town and urban district councils with a population not exceeding 20,000 have brought replies from 440 councils, 414 of which have no serious shortage, present or prospective. Serious shortage is described by 21; of these, 13 have schemes for new sources of supply in hand, 5 more have new sources available, and 2 are relying on economies in consumption. Five councils of areas not yet suffering from shortage fear it later if enough rain does not fall by the end of September.

Of 290 rural district councils sending answers, 79 complain of serious shortage in some part or parts of their districts. Of these, 19 state that alternative supplies are already available, 27 that water is being carted or carried, and 13 that wells are being deepened or other measures taken. A further 32 say that they are not yet suffering from shortage, but will suffer later if enough rain does not fall by the end of September. Engineering inspectors of the Ministry have made special visits to over 50 rural districts during the last few weeks; they find that emergency measures are in hand where required, and that permanent schemes are being worked out in many areas. By July 12th applications for grant under the Rural Water Supplies Act had been received from 123 rural district councils covering 620 parishes, for schemes of permanent improvement, at an estimated total cost of £1,778,000. Grant had already been promised to 47 councils, covering 286 parishes, for schemes estimated to cost £859,000.

In London as a measure of precaution an Order has been issued reducing to 50 million gallons per day the minimum quantity of water which has to be left to pass over Teddington Weir before water from the Thames can be taken by the Metropolitan Water Board. It is believed that much larger economies in the use of water can still be effected in the metropolitan area without any hardship. Round about June 20th the natural flow at Teddington was down to about 230 million gallons, compared with the standard average for June of 819 million gallons. The lowest daily average for any month recorded in previous years was in July, 1921, when the discharge was 205 million gallons daily. The effect of the rain towards the end of June was to raise the daily flow from 230 million gallons on June 25th to 400 million gallons on the 26th, but the flow fell again rapidly and is now about 200 million gallons. At a meeting of the Board on July 13th Sir William Prescott, the chairman, said that there was no need for a scare about London's water-supply. It was estimated that if the rainfall during July, August, and September was the same as for the corresponding months of 1921 (a period of drought) and assuming the natural flow of the Thames to be 200,000,000 gallons a day during July, 170,000,000 gallons during August, and 150,000,000 during September the available quantity of water in the storage reservoirs would be 8,000,000,000 gallons on Sept. 30th.

In June, although local thunder-storms caused heavy rain in places, the general fall over England and Wales was only 1·73 inches, compared with a normal value of 2·44 inches—a deficiency of 29 per cent. At many places in the Midlands and Southern England the month yielded less than half the normal. The rainfall of the twelve months to the end of June over England and Wales as a whole was 26·21 inches, compared with the average of 35·23 inches—a deficiency of 26 per cent. Over a wide area lying south-west of a line extending from North Lancashire to the Thames Estuary the deficiency exceeded 30 per cent.

On July 17th Sir Hilton Young received a deputation from the British Association and the Institution of Civil Engineers, who invited the Government to give favourable consideration to the institution of a complete and systematic survey of the water resources of the country. The deputation suggested that the existing records both of surface water, including river run-off, and of underground supplies were very incomplete.

Homeless in London

It has long been the custom to take an annual census of homeless persons in London. This year it was carried out on the night of Feb. 16th–17th, and the results have lately been reported to the London County Council. As on former occasions the census comprised apparently homeless persons in the streets; those accommodated in shelters, hostels, refuges, and labour homes; those in casual wards; and those in licensed common lodging-houses. The whole of the administrative county of London was covered by the census, and some 120 miles of streets were systematically examined by 26 officers in the public assistance department.

This year the night was fine and clear and the temperature moderate, and the number of apparently homeless persons found in the streets and under arches was 88 (68 men and 20 women). This is more than that shown by the census taken in 1933, when snowy conditions prevailed, but approximates to the numbers found in the two previous years, when the weather conditions were similar.

The total number of persons who might be regarded as homeless (i.e., excluding those who paid for their beds in common lodging-houses) was 3071 (viz., 2795 men, 266 women, and 10 children) as compared with 2948 in 1933. It was made up as follows:—

	Men.	Women.	Children.	Total.
Seen in streets and under arches	68	20	—	88
Accommodated in voluntary homes and hostels	434	223	7	664
Accommodated in labour homes	363	—	—	363
Accommodated in "sit-up" shelters	505	4	—	509
Free beds in common lodging-houses	252	19	3	274
Given beds in common lodging-houses by voluntary societies and expected to perform certain work	589	—	—	589
Accommodated in casual wards and The Hostel	584	—	—	584
Totals	2795	266	10	3071

There were 31 fewer men in casual wards and in The Hostel than in 1933, and in licensed common lodging-houses there were 1459 persons fewer.

Comparison of records for the past few years shows a steady decline since February, 1931, in the number of the people under consideration. (In 1904 the figure was 26,457, with 1797 in the streets; in 1931 it had fallen to 16,948, and this year it was 13,529.) For ten years, however, there has been

little change in the number found in the streets, on staircases, and under arches.

It is noteworthy also that the number using voluntary societies' homes and shelters is on the increase. Such homes include the Cecil Houses for women established in various parts of London through the efforts of Mrs. Cecil Chesterton, and in view of the reasons which led to this undertaking (see THE LANCET, 1927, i., 659) we are glad to learn that the Council's public assistance committee proposes to give detailed consideration to certain aspects of the present census in its relation to the general question of the homeless poor. The problem is a difficult one, as was obvious from the report on common lodging-houses issued by the medical officer of health in 1927, and reviewed in our columns (loc. cit.). But in spite of comparatively reassuring figures those familiar with the neighbourhood of the Embankment during the past winter will find difficulty in believing that it has yet been adequately solved.

The Census

H.M. Stationery Office have now issued, at 30*s.*, a volume containing the occupations statistics derived from the 1931 census of England and Wales. Besides figures for the country as a whole, data are furnished for 12 geographical regions into which the country has been divided, and also for counties and large urban areas. The system of classification of occupations used for the 1921 census has been substantially retained, and is described in detail, with an alphabetical index of about 35,000 occupational terms, in a separate volume entitled "Classification of Occupations" (12*s.*).

An innovation has been introduced by the inclusion of census statistics of persons out of work at the date of the census. The classifications of such persons embrace all classes of the community, including those outside as well as those within the scope of the various insurance schemes. In the present volume the reader will find comparative material by means of which the larger features in the occupational changes which took place between 1921 and 1931 may be studied. The general character of these changes, with their drift away from agriculture and heavy industries, is, of course, already well known.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 7TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 1 (last week 1); scarlet fever, 2245; diphtheria, 1114; enteric fever, 35; acute pneumonia (primary or influenzal), 601; puerperal fever, 43; puerperal pyrexia, 123; cerebro-spinal fever, 15; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 8; dysentery, 7; and ophthalmia neonatorum, 88. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 16th–17th was as follows: Small-pox, 0 under treatment, 0 under observation (last week 1 and 0 respectively); scarlet fever, 1586; diphtheria, 1544; measles, 1061 (last week, 1224); whooping-cough, 300; puerperal fever, 27 mothers (plus 9 babies); encephalitis lethargica, 269; poliomyelitis, 2; "other diseases," 215. At St. Margaret's Hospital there were 15 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there were no deaths from small-pox, 1 (0) from enteric fever, 17 (3) from measles, 4 (0) from scarlet fever, 21 (5) from whooping-cough, 32 (11) from diphtheria, 35 (6) from diarrhœa and enteritis under two years, and 15 (1) from influenza. The figures in parentheses are those for London itself.

Of the deaths from measles 3 were in Tynemouth and 2 in Liverpool. Whooping-cough caused 3 deaths in Birmingham and 2 in Manchester. Four fatal cases of diarrhœa and enteritis were reported from Birmingham, 3 in Manchester, and 2 each in Bradford, Newcastle-upon-Tyne, Salford, and Wolverhampton.

The number of stillbirths notified during the week was 251 (corresponding to a rate of 37 per 1000 total births), including 42 in London.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THERE will be ten vacancies for medical officers in September next. Candidates must be less than 28 years of age, and the term of service will in the first place be three years. Further particulars are given in our advertisement columns.

S. G. French to be Surg. Lt. (Short Service).

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. (D) J. E. Daniels to be Surg. Lt.-Comdr. (D).

Surg. Sub-Lt. H. R. Vickers to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS

H. V. D'A. Iles to be Lt. (on prob.), and is seed.

RESERVE OF OFFICERS

Lt.-Col. A. J. Williamson, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY

Lt.-Col. H. F. Wilkin (ret. T.A.) to be Lt.-Col.

H. B. Lee (late Offr. Cadet Serjt., Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt.

H. S. H. Gilmer to be Lt.

INDIAN MEDICAL SERVICE

Lt.-Col. A. A. McNeight to be Col.

Lts. to be Capts.: W. A. N. Marrow, H. B. Macevoy, M. M. Mansfield, J. Guthrie, W. J. Stewart, J. D. Grant, W. H. G. Reed, T. E. Palmer, D. G. McCaully, F. C. Jackson, J. W. Bowden, J. M. Sclater, J. D. Murdoch, C. F. Garfit, D. K. L. Lindsay, D. R. Tweedie, A. T. Andreasen, W. S. Morgan, M. S. Purvis, M. E. Kirwan, R. D. MacRae, C. J. H. Brink, W. Mackie, G. S. N. Hughes, J. W. Richmond, A. D. Barber.

Lts. (on prob.) to be Capts. (on prob.): M. Ata-Ullah, G. B. Thomas, J. White, H. A. Ledgard, T. F. O'Donnell, W. W. Laughland, S. Ahmad, C. C. Kapila, F. W. Allinson, F. R. Cawthorne, W. B. Stiver, F. V. Stonham, J. M. Mathew, J. G. Stonham, L. Feinhols, G. F. Harris, F. W. Whiteman, F. C. Leach, and R. D. Scriven.

ARMY IN INDIA RESERVE OF OFFICERS

Capt. M. L. Gujral relinquishes his commn., on appt. to the I.M.S.

ROYAL AIR FORCE

Flight Lt. J. MacC. Kilpatrick is promoted to the rank of Squadron Leader.

Flight Lt. D. Loughlin is transferred to the Reserve, class D.

Dental Branch.—Flying Offr. D. I. Malcomson is promoted to the rank of Flight Lt.

SPECIAL RESERVE

Flying Offr. R. H. Vartan is promoted to the rank of Flight Lt.

DEATHS IN THE SERVICES

The death is reported of Surg.-Lieut. (D) J. W. Robinson, R.N., one of a party of officers from H.M.S. *Devonshire* who, while sailing opposite the island of Samos on July 14th, were fired upon by Turkish sentries. Surg.-Lieut. Robinson was hit and lost overboard.

Lt.-Colonel Jeremiah Penny, I.M.S., retired, who died on July 7th during a voyage home from India, aged 70, qualified with the double English diplomas in 1887, having studied medicine at King's College Hospital, where he afterwards held several junior appointments. He was also House Surgeon at St. Peter's Hospital for Stone. In 1891 he received his first commission in the Indian Medical Service, and was in Burma in 1892–93—Chin Hills (medal and clasp). He reached the rank of Lt.-Col. in 1911.

OBITUARY

WILLIAM WILFRID KING, M.B., Ch.B. Bristol, F.R.C.S. Edin., F.C.O.G.

THE death occurred on July 9th of Mr. W. W. King, a prominent gynæcological surgeon in Sheffield, who had played a great part in the hospital developments of the city during the past 20 years. He was in his 52nd year.

King was educated at Stonyhurst, received his professional training in the medical school of Bristol University, took the English double diploma in 1906, and obtained the F.R.C.S. Edin. in 1908. Two years later he graduated as M.B., Ch.B., at Bristol. He was for a time house surgeon at the Royal Hospital, Sheffield; he then became resident obstetric officer at the Royal Infirmary, Bristol, but continued his association with Sheffield by becoming house surgeon and, later, registrar to the Jessop Hospital for Women; he was then duly appointed surgeon to the hospital and lecturer in gynæcology and obstetrics in Sheffield University.

King, prepared by long residence at a special women's hospital, seized the opportunity to increase his knowledge in general pathology by taking the post of clinical pathologist at the Royal Infirmary, Sheffield, which he occupied from 1911 to 1920. He was soon recognised among his colleagues and the public for his sound gynæcological work. He became an acknowledged expert in his specialty, not only locally but over a wide area, and was an exceptionally successful operator. His special interest was the investigation of the causes, near and remote, of puerperal fever. He wrote on this subject and on pelvic adenomyomata in the *British Medical Journal*, and contributed other papers to the *Journal of Obstetrics and Gynæcology*, and to the transactions of the North of England Obstetrical and Gynæcological Society, in the service of which body he served as secretary and president. The transactions of that society from 1912 onwards contain many records of his valuable papers and communications, and of the remarks, variably apposite and illuminating, with which he reinforced the society's discussions. Widely read, keenly observant and alert, with a very large clinical experience and deep interest in its pathological aspect, he was always prepared to discuss usefully any question involving his specialty. The paper on the clinical symptoms of pelvic adenomyoma was read at the annual meeting of the British Medical Association at Bradford in 1924, and has been often drawn upon by other writers on that subject. Many authorities also consider his observations and views on the difficult subject of puerperal sepsis to be of the greatest importance. For the past seven years he had controlled 30 lying-in beds at the Nether Edge Municipal Maternity Hospital, thus adding to his experience and responsibilities. He was an examiner in his subjects at Sheffield University and the Central Midwives Board, and had been elected F.C.O.G. for his valuable work in connexion with the foundation of the new College.

King had an extremely critical sense and accepted nothing unless he could convince himself that it was right and logically sound. This attitude of mind rendered him most valuable as a colleague, and though he was often in disagreement, yet, on the other hand, he was always ready, if necessary, to acknowledge he was wrong, and when once convinced gave his whole-hearted support to further the project under consideration. By a tragic coincidence, it was during the investigation of an outbreak of puerperal sepsis that he developed a streptococcal infection of the throat, from which arose the septicæmia which, after several weeks' illness, caused his death.

King was a member of a well-known West Country Catholic family, was deeply religious, and the Catholic community of Sheffield have lost one whom it will be difficult to replace. This was apparent from the large congregation which attended the Requiem Mass held at St. Marie's Church, Sheffield, and was present later at the interment. The medical and lay community of Sheffield have lost a valued member and the medical students an inspiring and forceful teacher. His loss will be especially felt by the board, staff, and patients of the Jessop Hospital, for which institution he had done so much faithful service.

FRANCIS EDWARD FORWARD, O.B.E., F.R.C.S. Eng.

THE death of Mr. Francis Edward Forward, which occurred on July 2nd at 12, West Park, Mottingham, London, S.E. 9, followed on an illness of over 18 months. Born in 1866 at Chard, Somerset, he received his general education at Sherborne and proceeded for medical training to St. Thomas's Hospital. He qualified with the English double diploma in 1889 and took the F.R.C.S. Eng. in the following year. He now joined the Colonial Medical Service as medical officer of the Holberton Hospital, Antigua, West Indies, a post which he held from 1891 for the following eight years, and was made a member of the Legislative Council of the Leeward Islands, of which Antigua is the seat of government. In 1899 he transferred to the Home Office Department and held various appointments in the Office until he retired in 1930, when he received the distinction of O.B.E. Mr. Forward leaves a widow and one son.

NEWMAN NEILD, M.B., Ch.B. Vict., F.R.C.P. Lond.

SENIOR PHYSICIAN, GENERAL HOSPITAL, BRISTOL

WE regret to announce the death of Dr. Newman Neild, senior physician to the Bristol General Hospital, which occurred suddenly on July 4th at his house, Richmond Hill, Clifton, Bristol.

Newman Neild, a Manchester man, was the son of the Principal of Dalton Hill, was educated at Bootham School, and pursued his medical curriculum at Victoria University, Manchester. He qualified in 1897 with the double English diploma and became house physician to the Royal Infirmary, Manchester; he then, in London, filled the important junior posts of house physician to the Brompton Hospital for Consumption and to Great Ormond-street Children's Hospital. He now settled in Bristol, and was appointed in 1901 assistant physician to the General Hospital, and in this capacity gained a sound reputation through his prolonged work in the X ray department, where he worked for 17 years with assiduity. He communicated to THE LANCET in 1909, in association with Dr. E. V. Dunkley, an interesting paper on the rôle of saliva in the transmission of tubercle, and their observations, which were considerably quoted 25 years ago, helped to make public authorities recognise the dangers of the then prevalent and nasty habit of expectoration in public vehicles. On promotion to full physician Neild took the diploma of M.R.C.P. Lond., and in 1928 was elected F.R.C.P. At the Bristol Medical School Neild lectured for a long period in pharmacology and therapeutics, in

which subjects he was recently an examiner for the diploma of the English Conjoint Board. He was an able draughtsman, and in conversation would often pull out paper and pencil and illustrate his views on the points under discussion. He was interested in old books, especially those relating to botany. He held many important posts in connexion with the British Medical Association, and enjoyed well-merited esteem for much all-round work, public and professional.

DAVID ROSS, M.D. Aberd.

Dr. David Ross, who died at his house in Kingsland-road, London, on July 4th, received his early education in Aberdeen, studied medicine in the University of the City, and also at St. Bartholomew's Hospital, London, and graduated M.B., C.M. Aberd. in 1894. In 1898 he obtained the M.D. Aberd. with highest honours, and shortly afterwards settled down to practice in the north of London, where he enjoyed a wide reputation for efficiency and public spirit. He did valuable service for many years for the British Medical Association, being at different times a member of the Representative Body and of the Council. He was for a time honorary medical officer to the Metropolitan Hospital, he served as President of the Hunterian Society, and was vice-chairman of the National Service Medical Board of the City of London. He was also for a period examiner in materia medica at the University of Aberdeen. Dr. David Ross was a very able man, well read and considerably travelled, and his death has been felt as a loss by a large circle.

CHARLES JOSEPH HEATH, F.R.C.S. Eng.

THE death occurred on July 13th at his house in York-terrace, Regent's Park, London, of Mr. C. J. Heath, who was principally known in connexion with methods devised for the remedy of chronic suppuration of the ear, and the restoration of hearing.

Charles Joseph Heath was born in 1856, and educated at Totnes Grammar School, proceeding for his medical training to St. Bartholomew's Hospital. He was a successful student from the beginning, winning the Treasurer's Prize in practical anatomy for first year students, and the Foster Prize awarded for similar proficiency to more advanced pupils; the result was an appointment as prosector at the Royal College of Surgeons of England. He took the diploma of M.R.C.S. in 1884, and the final Fellowship in 1886. He was then, for a period, house surgeon at the Preston Royal Infirmary, but continued his interest in structural anatomy, and decided to specialise in otology, as providing an outlet for his skill in dissection. He returned to London, and was appointed assistant surgeon to the Central London Throat, Nose and Ear Hospital, and later surgeon to the Golden-square Throat, Nose and Ear Hospital, his services being also requisitioned by the Metropolitan Asylums Board.

The procedures which he devised for the cure of chronic suppuration of the middle ear, without removal of the drum or ossicles, were described in a paper read before the Otological Society in 1904. Accompanying the reading of this paper he showed several patients who had been operated upon by his modification of the radical mastoid operation. This paper was itself a sequel to one read before a local medical society previously in which he had endeavoured to demonstrate the good results of his operative measures. In the interval he had performed his operation a hundred times with such a measure of success that he was, he said, convinced that it, possibly with slight modifications, would ultimately be adopted as a means of restoring hearing to a large number of persons afflicted with suppurative disease. But although his views led to close discussion he made few disciples among the leaders of his specialty. In 1907 he described in our columns ten cases where the cure of chronic suppuration of the middle ear had followed the employment of his methods, neither the drum nor ossicles having been removed, and the hearing remaining good. He continued to report on the favourable results of further series of patients, and at a debate before the British Laryngological, Rhinological and Otological Association in the same year he met with more support than he had previously experienced, though words of caution were uttered with regard to the dangers that his variation in the radical mastoid operation might bring about. He had a large practice as an aural surgeon, and spoke at congresses and wrote in the transactions of societies and elsewhere, with conviction, on his subject. During the war he was attached as aural surgeon to one of the military hospitals, and his mechanical aptitude was here displayed in modifications of the gas helmet, while he also put forward an altered design for army boots.

Heath was a keen sportsman, and a member of the Wild Birds Advisory Committee of the Home Office. He was devoted to both fishing and shooting, and in connexion with the latter sport it is characteristic of him that he invented a wild-fowling gun. He was a widower, his wife, who died in 1930, being the daughter of Colonel J. J. Wilson, he is survived by two daughters.

ALEXANDER THEODORE BRAND, M.D.

THE death of Dr. Alexander Theodore Brand at the advanced age of 81, which took place at Great Driffield, Yorks, will be deeply regretted by a large circle of patients and personal friends. To one of these we owe the following biographical note.

"For some years Alexander Brand was engaged in business in Aberdeen, but he always had a great desire to study medicine, and in 1877 he began his course at the University of Aberdeen, being a good many years older than his fellow students, and the writer of these lines, who began his curriculum in the following session, admired at the time, and has ever since from a fuller experience of life continued to admire, the good fellowship and understanding which always existed between him and his juniors. This was a state of affairs which was to the credit not only of Brand but of the youngsters who worked alongside of him. He qualified as M.B., C.M. in 1881 and proceeded to the degree of M.D. in 1884. Some time was spent in the London and Vienna schools and then he became associated with the late Dr. Eames in his practice at Great Driffield, and when Dr. Eames left the district he carried on the practice for some time alone and later in association with his relative Dr. J. R. Keith. He was not a frequent writer, but he made certain communications in support of the infective nature of cancer on which he held strong views.

When Brand was in business in Aberdeen he was a keen volunteer and held commissioned rank in the 1st Volunteer Battalion of the Gordon Highlanders. Later he became Major in the R.A.M.C. and was O.C. 2nd Field Ambulance East Yorks Volunteers, and retired with the rank of surgeon major (V.D.). He was much interested in the work of the St. John Ambulance Association and he was an officer in the Order of St. John. For many years he was the

medical officer of the Driffield and District Poor-law Infirmary. He was a man of fine presence, great charm of manner, courteous, kind, and absolutely straightforward in his dealings."

SIR JAMES KINGSTON FOWLER.—The accidental mutilation of a sentence in the obituary notice which appeared last week of Sir James Kingston Fowler must be corrected. The notice states that not many of his colleagues on the Beit Foundation knew him personally; the exact reverse was the case, and the sentence should have run "not many of the other Fellows knew him personally." We much regret the error.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Milk Bill and the Tuberculin Test

IN the House of Lords on Thursday, July 12th, Earl DE LA WARR, Parliamentary Secretary to the Ministry of Agriculture, moved the second reading of the Milk Bill which has already passed through the House of Commons. He said that the Government could feel that in this Bill they were putting before their Lordships a really balanced policy for the milk industry. It could be divided into three parts. The first was an attempt to save the industry and stave off ruin by putting a bottom into the market. That scheme would cost something over £1,500,000 per annum. That payment would operate over a period of two years, and after that period if prices had risen to a certain height these payments would have to be repaid to the Exchequer. The second and third parts of the policy constituted an attempt to increase the production of milk in this country. The first method of doing that was by cleaning up the herds from the fell disease of tuberculosis, which was, unfortunately, too common among cows, and the second method was a scheme of milk publicity, of spending £500,000 a year for the next two years very largely on increasing the supply of milk in schools for school-children.

Lord MARLEY said that Earl De La Warr had said that they must improve the quality of milk and increase the consumption and he proposed to spend public money in doing those two things simultaneously. Was he going to use public money to advertise immediately by an increased consumption of rotten milk which was now being distributed or was he going to wait until the milk was really good before he advertised by an increase in the consumption by school-children? The noble lord should have said that the quality of milk in this country was probably less good than in any modern civilised country. According to the Report of the Committee on Cattle Diseases, at least 40 per cent. of the cows in dairy herds in this country were infected with tuberculosis. Was the Government going to try to bring about an increase in the consumption of liquid milk by the children of the workers of this country when he knew that the effect must mean an increase in the percentage of the distribution of milk which was not free from tuberculosis? He thought that some of the measures proposed for cleaning up the herds were good and he welcomed the change in the grading of milk. The proposal to pay premiums for pure milk was also a very good preliminary measure. He knew that a system of this kind had resulted in an enormous reduction in the number of bacilli per cubic centimetre and an improvement in the fat content. He was not unaware of the immense value of the drinking of raw liquid milk, and even of skimmed milk, by school-children. These were good things, but the milk must be pure. He regarded this Bill as a trick measure which he did not believe would do what the nation wanted. There was no sign that it would be T.T. milk that would be supplied to school-children. The only way that they would get a move on in getting pure milk in adequate quantities for the nation was by preventing the sale of non-tested milk by retailers.

Lord CRANWORTH said that from time to time the medical profession had urged the necessity for cleaning up the milk-supply. He would be happier if, when they criticised the uncleanly methods of British farmers, they also turned attention occasionally to the people overseas as well. An analysis of the skimmed sweetened and unsweetened milk imported from abroad had shown that practically the whole value of that compound lay in the sugar. For hundreds of thousands of children in the poorer classes that was the only form of milk which they got. In all probability the harm done to those children by drinking that condensed sweetened milk was far greater than if they drank the dirtiest milk produced on any British farm. Probably 80 per cent. of the cows that were reactors could be discovered by careful and regular clinical examinations. In a year or two those reactors and dangerous cows would become fewer and fewer until in all probability they became almost non-existent. The scheme now proposed for accredited herds was an eminently desirable one, for the herds to be accredited would have to pass through a minimum number of clinical examinations a year, but it was still more important that all herds should be subject to periodical clinical examination. There was also the question of the reliability of the test. Anyone who had herds would know how desperately unreliable these tests were at present. If they were going to increase very largely the veterinary staff it was hardly likely that the standard of veterinary skill would increase in the way necessary to make the test as reliable as it should be. In the case of bovine tuberculosis science had made as great strides as in other branches of medicine. A book had just been published called "Spahlinger *contra* Tuberculosis." It contained a host of reliable names giving evidence, lay, medical, and veterinary. It described Spahlinger's experiments in Switzerland and in Norfolk which were successful. Finally, the Government of Northern Ireland were so impressed by these tests that they decided to hold a Government inquiry. On December 17th, 1932, they published a report of an official demonstration made in Belfast which showed that 100 per cent. of the calves immunised by Spahlinger's vaccine had triumphantly resisted an infection of tuberculosis which proved fatal to non-vaccinated calves in a few weeks. To the medical man there might very well be reasons which proved that all that was stated in this book was not true, but it was full of names of the very highest repute, and if one-quarter of what was said was true this was a thing that ought not to be lightly set aside.

Viscount ASTOR said that it was obvious that a certain amount of milk was unsatisfactory and even dangerous, but it was very easy to emphasise the danger to children by over-emphasising that particular point. It was probable that of the cows which reacted to the tuberculin test only 22 per cent. gave tuberculous milk, and that of the whole tuberculous population only 5 per cent. suffered from bovine tuberculosis. The deaths from non-pulmonary tuberculosis, and on the whole that was the infantile death-rate, in 1911 was 14,600. Last year the deaths had dropped to 5400, or about one-third of what they had been. That indicated a very decided improvement in the quality of the milk available for children. If they were to make a herd tubercle-free it was absolutely vital that they should have a reliable test, otherwise they got reinfection in the herds. Unless they had skilled veterinary surgeons of experience to carry out this very difficult work they would not get similar results. In regard to

the tuberculin used, it was necessary that its potency or strength should be adequate, and that the strength of all tuberculin used for the test should be the same. The Tuberculin Committee of the Medical Research Council had emphasised in a memorandum the importance of satisfactory tuberculin. He suggested that either the Government should standardise tuberculin, or if that was impossible owing to administrative difficulties, then the Government should restrict the use of tuberculin for licensed herds to specified brands of known and adequate potency. If they did that he was certain that the process of cleaning up the herds would be accelerated and they would induce more farmers to test their herds and produce greater confidence among the public. He also urged that there should be more frequent testing than twice a year.

After further debate,

Earl DE LA WARR said that for the purpose of the final test of herds only standardised tuberculin would be used. Further it was hoped that in future when legislation made possible the control of certain therapeutic substances, that tuberculin would be one of the first substances to be dealt with. With regard to the scheme for milk in schools, such milk would be approved by the medical officer of health, and where the medical officer of health was not the same man as the school medical officer then it would also have to be approved by the school medical officer. He was quite sure therefore that Lord Marley would regret having thrown such an unfounded charge at the head of the Government as that they were going to force dirty milk into the schools.

Lord MARLEY said that he was very glad that that would not be the case.

The Bill was read a second time.

Poor Law (Scotland) Bill

The Poor Law (Scotland) Bill was also read a second time.

Royal Assent

On July 11th the Royal Assent was given in the House of Lords by Royal Commission to a number of Acts, including the Finance Act and the Prince of Wales's Hospital, Plymouth, Act.

Domiciliary Nursing Services

On July 10th, in the House of Commons, Sir G. HURST asked leave to bring in a Bill to enable local and county authorities to provide for domiciliary nursing services, to appoint and pay nurses, to provide accommodation for them, and to make reasonable subscriptions or donations to voluntary associations.

Leave was granted and the Bill was read a first time.

In the House of Commons on July 16th the Ministry of Health Provisional Order Confirmation (South Middlesex and Richmond Joint Hospital District) Bill was read the third time.

Road Accidents and Medical Treatment

In the House of Lords on Tuesday, July 17th, the Road Traffic Bill was considered in Committee. The Earl of ONSLOW was in the chair.

On clause 1 (which imposes a general speed limit of 30 miles an hour on built-up areas.)

Viscount CECIL moved an amendment to leave out the words in the clause which provided that the speed limit should not operate between midnight and 5 A.M.

The Earl of PLYMOUTH, speaking for the Government, said that out of 7000 fatal accidents on the roads in 1933, less than 160 occurred between midnight and 5 A.M. Less than half of these, 65, were in built-up areas. Of 3000 pedestrians killed in 1933, over 2700 were between the ages of 15 and 55, and most of such people would not be about on the roads between midnight and 5 A.M. There was also the difficulty of enforcing a speed limit during those hours.

The amendment was strongly supported by several noble lords and was agreed to.

Viscount BERTIE OF THAME moved a new clause providing that a person charged with driving a car when under the influence of drink or drugs should be subject, if so required, to be examined and tested with respect to his condition as soon as might be after his request by a registered medical practitioner selected by the police, and should have the right to be examined and tested also, if he so desired, by a doctor or other person selected by himself. He said that if the clause was accepted everybody would know that if they were charged with being drunk or under the influence of drugs while in charge of a motor-car they would be subjected to a medical examination, whether they consented or not.

The Earl of PLYMOUTH said that there was something in the proposal that where drunkenness was an element in an offence a person charged should not be able to prevent an examination which might help to ascertain his real condition. The clause, however, would go too far in some cases and not far enough in others. In practice it was often impossible for the police to decide until after a medical examination whether a charge ought properly to be brought or not, and a person might be ill and not under the influence of drugs or drink. The clause was too wide in that it subjected to risk of punishment a person who objected to conform to the test suggested. In practice the noble lord's proposal was not required. In any case where a person's condition was a matter of doubt, it was the well-established practice of the police to call in a doctor to examine him, and if he wished also to be examined by a doctor nominated by himself he was allowed to do so and the police had instructions to that effect. The truth was that medical examination did not lend itself to compulsion backed by legal sanction.

The new clause was withdrawn.

The Earl of PLYMOUTH, replying to a question by Earl HOWE with regard to the possibility of prohibiting the use of motor horns at certain hours at night, said that the Minister of Transport had had the matter under consideration. It was the Minister's ntention to proceed cautiously and experimentally, and to select certain limited areas in which to prohibit the use of motor horns during certain hours of the night.

On clause 13 (payments and insurance in respect of emergency treatment of injuries arising from the use of motor vehicles on roads.

Lord SANDHURST moved to leave out the word "motor" so as to make the clause applicable to accidents caused by other forms of vehicles. He said they were doing their best to reduce accidents on the roads, and one of the most important things in that connexion was to create a spirit of good-will and helpfulness on the roads. If they were going to start a spirit of class destruction and encourage class war on the roads they would not get the spirit of helpfulness which was necessary. By the inclusion of the word "motor" in the Bill they were stigmatising one set of people. This would not do the medical profession a good service. At present doctors were only being paid for emergency treatment in respect of one-third of the road accidents. He saw no logical reason for that. If the doctors were going to collect thousands of fees at 12*s.* 6*d.* in respect of such treatment they should collect for all the accidents and not only for two-thirds of them. He agreed that they should do something to see that doctors were paid for their services, but the only way to do it was to see that every vehicle user shared the responsibility. That would encourage more vehicle users who were not motorists to be a little more careful.

The Earl of PLYMOUTH said he could not accept the amendment.

The amendment was negatived.

Lord SOMERLEYTON moved an amendment providing that the clause should apply not only to accidents on the roads but also to accidents in places to which the public had a right of access.

Earl HOWE said that nothing could better illustrate the intolerable injustice which it was proposed to inflict under this Bill than the fact that a motorist, if he left his car in a parking place, and an errand boy ran into it on his bicycle, might have to pay the doctor's fee of 12*s.* 6*d.* He had every sympathy with the doctors, but if they perpetuated this injustice on the motoring public they were in some danger of raising insurance premiums, especially on the lighter class of vehicles, to a point which many motorists could not afford to pay.

The Earl of PLYMOUTH said that the amendment was open to a number of objections and he could not accept it.

Lord SOMERLEYTON said that the hospitals were not built for motorists but for the sick poor of the neighbourhood. The hospitals found great difficulty in getting payment for the treatment of road accidents, and the total cost to hospitals of such accidents was about £230,000 a year. That sum spread over 2,000,000 motorists would not mean more than about 2*s.* 6*d.* each. He would, however, withdraw the amendment at this stage.

The amendment was, by leave, withdrawn.

The Committee stage of the Bill was adjourned.

HOUSE OF COMMONS

THURSDAY, JULY 12TH

Reports of School Medical Officers

Mr. TOM SMITH asked the Parliamentary Secretary to the Board of Education whether the Board's recommendation last year that the annual reports of school medical officers should be abridged as much as possible holds for the present year; and whether, in view of the valuable nature of these reports, the department will reconsider its views on the question.—Mr. HERWALD RAMSBOTHAM replied: The Board have not recommended that the annual reports of school medical officers should be abridged as much as possible. In a memorandum which they issued to local education authorities in January last, they stated that where any of the arrangements had been fully described in previous reports and remained unaltered, it would be sufficient to refer to the relevant sections of a previous report. It was pointed out that, apart from economy in printing, this would enable fuller information to be given as to any new developments during the year, or as to matters which had been the subject of special investigation.

Meals for School-children

Mr. GEORGE GRIFFITHS asked the Parliamentary Secretary to the Board of Education the names of the ten local education authorities which were intending shortly to use their school meals powers under the Education Act, 1921.—Mr. H. RAMSBOTHAM replied: Proposals made by the following seven local education authorities have been formally or conditionally approved by the Board: Cannock, Caernarvonshire, East Retford, Hereford (borough), Llanelly, Loughborough, Staffordshire. A scheme of the Bedford borough authority was approved some time ago but the authority have not yet put it into operation, owing to the assistance received from voluntary funds. Two authorities (Chadderton and Worcestershire) were not included in the 190 authorities mentioned in my speech of May 30th last on the Board's estimates, as they were not at that time exercising their powers, although they had done so at an earlier date. Their arrangements have been approved.

Housing Progress

Mr. GARDNER asked the Minister of Health what was the number of houses built and under construction at the last convenient date under the Housing Act, 1930; and what additional number of houses was added thereby to the total housing accommodation which the new houses replaced.—Sir HILTON YOUNG replied: The numbers of new houses completed and under construction under this Act at March 31st last were 17,569 and 10,512 respectively. The number of houses which had been demolished under this Act at the same date was 19,840.

Medical Officer for Maternity and Child Welfare

Mr. TOM SMITH asked the Minister of Health whether he had yet filled the post of medical officer for maternity and child welfare rendered vacant by the resignation of Dame Janet Campbell and, if not, when he proposed to do so.—Sir HILTON YOUNG replied: I have placed in charge of the maternity and child welfare work a most experienced woman medical officer, who previously acted as deputy to Dame Janet Campbell. She is directly responsible to the chief medical officer, and receives additional remuneration for her increased responsibilities. An additional woman medical officer will shortly be added to the staff engaged in this important branch of the work of the medical staff.

Sir FRANCIS FREMANTLE: Is it a fact that the successor to Dame Janet Campbell has not been given the same rank as she had; and may I ask whether it is proposed that she shall have such rank?

Sir HILTON YOUNG: No, sir, the title of the office is subject to an alteration which I shall be very glad to explain to my hon. friend if he requires the information.

Surplus National Health Insurance Funds

Sir ROBERT GOWER asked the Minister of Health what were the total surplus funds standing to the credit of approved societies under the Health Insurance Acts at the latest available date; what was the total amount set aside by approved societies for the last insurance year for additional benefits; the nature of such additional benefits and the amounts respectively allocated; and what were the total reserved funds.—Sir HILTON YOUNG replied: The total surplus funds of all approved societies with head offices in England and Wales disclosed at the third valuation amounted to £32,479,359, of which £18,427,696 was set aside for additional benefits, and the balance was kept in reserve. The additional benefits took the form of increases in the normal rates of sickness, disablement, and maternity benefits, and payments towards the cost of various benefits in the nature of treatment, such as dental, ophthalmic, hospital, and convalescent home treatment, and the provision of medical and surgical appliances. The total amounts allocated to such treatment benefits in the year 1933 were as follows:—

	£
Dental	2,201,893
Ophthalmic	469,594
Hospital treatment and convalescent home treatment	388,858
Medical and surgical appliances ..	183,169
Other treatment benefits	145,086
Total	£3,388,600

MONDAY, JULY 16TH

Tarred Roads and Cancer

Mr. HEPWORTH asked the Minister of Health whether he proposed to investigate the theory that the tarring of roads was possibly connected with the existence of cancer.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied: Investigations on this matter are already being undertaken in various quarters, and any available information on the subject will receive careful consideration by the Departmental Committee on Cancer. My right hon. friend is advised, however, that prolonged inquiries will be necessary before any definite conclusions can be reached.

Slum Clearance in Lancashire

Mr. GORDON MACDONALD asked the Minister of Health the number of houses completed in Lancashire under the 1930 Housing Act; the number of houses at present under construction; the number of houses which had been demolished under this Act; and the number of persons living in the said houses prior to demolition.—Mr. SHAKESPEARE replied: The numbers of new houses completed and under construction under this Act in the geographical county of Lancashire at May 31st last were 2032 and 1620 respectively. The number of houses which had been demolished (or partly closed) under the Act in the county at March 31st, 1934, was 1940, and the number of persons displaced therefrom was 7914.

MEDICAL NEWS

Royal College of Surgeons of England

At a quarterly meeting of the council, held on July 12th, Sir Holburt Waring was re-elected president, and Mr. Wilfred Trotter, F.R.S., vice-president. Prof. A. H. Burgess was elected vice-president.

Prof. William Wright (anatomy) and Prof. John Mellanby, F.R.S. (physiology), were appointed to conduct a primary examination for the fellowship at Madras in December, 1934.

The following professors, lecturers, and demonstrators were appointed for the ensuing year:—*Hunterian Professors:* Mr. Harold Burrows, the sex hormones in relationship to surgical pathology; Mr. C. Max Page, late results of the operative treatment of osteo-arthritis; Mr. Walter R. Bristow, internal derangement of the knee-joint; Mr. T. Pomfret Kilner, transplantation of skin; Mr. Laurence O'Shaughnessy, the surgery of the lung root; Mr. H. J. Seddon, the morbid anatomy of caries of the thoracic spine in relation to treatment; Mr. B. W. Rycroft, recent investigations in the ætiology and treatment of glaucoma; Mr. G. C. Knight, the innervation of the œsophagus in relation to the surgical treatment of achalasia of the cardia; Mr. Lambert C. Rogers, the surgery of spinal tumours; Mr. C. Bowdler Henry, the ætiology and treatment of misplaced third molars; Dr. Macdonald Critchley, the morphology of the cerebro-spinal arteries and their clinical significance; and Dr. James F. Brailsford, dystrophies of the skeleton. *Arris and Gale Lecturer:* Dr. John Beattie, three lectures on the anatomy and physiology of the hypothalamus. *Erasmus Wilson Lecturers:* Mr. R. Davies-Colley, Mr. C. E. Shattock, Mr. Cecil P. G. Wakeley, and Mr. E. K. Martin, one demonstration on pathology; Mr. T. B. Layton, one demonstration on the rhinological (or nasal) aspects of (or problems in) mummification; and Mr. Ronald W. Raven, one demonstration on abnormalities of surgical importance resulting from the persistence of rudimentary embryological structures. *Arnott Demonstrator:* Dr. John Beattie.

Sir Frank Colyer, honorary curator of the odontological collection, and Mr. C. J. S. Thompson, honorary curator of the historical collection, were reappointed for the ensuing year, and Miss M. L. Tildesley was reappointed curator of the department of human osteology for the next six months. The Hallett prize for anatomy and physiology was awarded to Dr. D. L. Griffiths.

Diplomas were granted jointly with the Royal College of Physicians as follows:—

D.P.H.—S. M. Ali, J. H. Dobbin, P. B. Lee Potter, E. K. Pritchard, J. M. Reese, and A. T. G. Thomas.

D.T.M. & H.—G. J. Allan, K. W. Allen, J. N. Atkinson, G. T. Barnes, I. S. Bhalla, R. H. P. Clark, F. J. Copeland, A. P. Davis, S. B. Dimson, Harry Epstein, P. S. Goonewardene, A. C. de B. Helme, N. M. James, W. B. Johnston, F. H. Reynolds, Maxime Shun-Shin, and C. H. Yeoh.

D.O.M.S.—E. D. Anklesaria, R. U. Gillan, George Gordon-Napier, T. R. Jansen, A. H. Lowther, D. W. McLean, L. H. Mottet, M. M. Parikh, A. A. Pomfret, Kulwant Rai, Dukhan Ram, W. E. Rutledge, A. C. Shuttleworth, S. B. Smith, M. M. Syddiq, and Charles Taylor.

D.P.M.—H. E. C. Aslett, C. N. Atlee, Alexander Baldie, L. T. Hilliard, S. G. James, Madeline R. Lockwood, John Mackay, F. E. Pilkington, C. H. Swanton, and A. H. Wilson.

D.L.O.—S. K. N. Chowdhury, Richard Howarth, A. R. Khan, Douglas Laing, W. B. McKelvie, C. E. S. Oxley, and I. A. Tumarkin.

D.M.R.—J. E. Blewett, Patrick Hogan, W. H. Hooton, A. H. Richardson, and A. M. Vlok.

Epsom College

At a meeting of the council on July 11th the France pension of £30 a year, together with a bonus of £12 a year, was awarded to Dr. J. H. Chaldecott.

British Empire Cancer Campaign

At the annual meeting of the Campaign held on July 9th in the House of Lords, Prof. W. S. Lazarus-Barlow, chairman of the appeal committee, announced that it is expected that the proceeds of the Empire Day appeal will eventually exceed £60,000. Of this sum £5330 was stated to be the result of the wireless appeal made by Lord Moynihan. The trustees of the Bernhard Baron Charitable Trust have announced that they have made a grant of £10,000, and this money will be put in a special fund.

University of Oxford

On July 15th the following degrees were conferred:—

D.M.—R. S. B. Pearson.

M.Ch.—H. F. Moseley.

B.M.—J. H. Bartlett, D. W. Geidt, W. H. A. Picton, C. E. Greenwood, R. I. Bence, T. W. Lloyd, A. M. G. Campbell, R. H. Gardiner, and C. A. Boucher.

University of Cambridge

At recent examinations the following candidates were successful:—

D.M.R.E.

Part I.—Morton Kahn and N. G. Moltra.

Part II.—T. R. Harlan, M. S. Kavarana, A. U. Millar, N. G. Moltra, G. R. Nolan, William O'Neill, J. P. Raban, C. W. Robertson, and T. F. Tierney.

University of London

At recent examinations the following candidates were successful:—

D.P.H.

O. M. Akbani, O. M. T. Ansari, K. P. Beaubrun, Catherine B. Crane, W. H. Crichton, F. R. Dennison, H. A. Dirckze, Margaret L. Foxwell, Muriel O. Gibson, J. B. Great Rex, G. S. C. de S. Gunesekera, Ellen G. Heycock, George Holroyd, F. E. Lipscomb, F. J. G. Lishman, G. H. Lowe, G. P. McC. Marshall, K. J. G. Milne, D. D. Payne, Ethel A. Perrott, C. D. Preston, *Alison J. Rae, L. B. E. Seneviratne, Mary Sutcliffe, L. G. W. Urich, M. H. Wace, E. C. P. Williams, and *S. L. Wright.

Part I.—Muriel V. Joscelyne, Hyacinth I. Lightbourne, and I. A. MacDougall.

* Awarded a mark of distinction.

M.S.

Branch I.—G. V. W. Anderson, Univ. Coll. Hosp.; A. W. Kendall, King's Coll. Hosp.; David Trevor (University medal), St. Bart.'s Hosp. and Charing Cross Hosp.; and H. L.-C. Wood, King's Coll. Hosp.

University of Liverpool

At recent examinations the following candidates were successful:—

M.D.

N. L. Corkill, V. C. Cornwall, J. M. Erskine-Young, L. Findlay, H. G. Hanley, E. Hughes, E. R. Jones, D. H. Mills, G. W. Phillips, and E. R. Smith.

FINAL EXAMINATION FOR M.B. AND CH.B.

Second Class Honours.—Margaret F. Procter and E. W. Jones.

Part B (1924 *Regulations*).—A. B. Concanon and T. H. Pierce.

Part III. (1929 *Regulations*).—Bessie Dodd, Jannett C. Evans, Kathleen M. Kavanagh, J. L. Lanceley, Annie A. Merrick, and W. I. D. Scott.

Part I.—L. V. Arundel, D. Barton, C. H. H. Bryson, P. S. Byrne, H. Cantor, Eunice M. Clapham, J. B. David, T. M. Doran, Mabel M. Drummond, Beryl Edgecombe, G. H. Elldige, A. Fairbairn, H. Gewater, A. J. Gill, H. F. Harwood, L. Henry, G. E. Hesketh, A. B. Higginson, Clarice Hughes, Gwendollen M. Hughes, T. Laithwaite, J. Leiper, H. R. W. Lunt, K. S. E. MacRae, J. V. Manning, N. E. Mawby, G. D. Owen, Kathleen M. Pearson, M. N. Phillips, G. Platt, B. Polonsky, D. M. Rosenfeld, A. Simpkin, A. Singer, W. S. Sutton, A. C. T. Vaughan, Joan Watts, and R. E. D. Wheeler.

Part II.—Agnes Y. Bowie, A. C. Brewer, J. L. Brown, A. Cohen, G. V. Craine, C. F. Crampton, H. W. F. Croft, H. R. G. Davies, Phillis Dingle, V. K. Drennan, B. J. Green, S. G. Griffin, R. L. Hartley, Clarice Hughes, J. E. E. Hughes, Mary M. Hurst, G. E. Jones, Joan G. Jones, E. W. Knowles, H. S. Lanceley, Ethna W. Little, Sheelah Little, G. B. Marsden, A. G. H. Menzies, F. R. Neubert, W. Parke, Margaret J. Roberts, J. G. Rogers A. R. Sibbald, Henrietta Sloan, and E. G. Watson.

D.P.H.

Part I.—G. McLoughlin.

Part II.—G. Clark, T. L. Hughes, E. R. Jones, J. A. Jones, F. Langford, E. R. Smith, and V. J. Woodward.

D.M.R.E.

Part B.—T. N. Fogarty, J. W. H. Foy, and S. K. Sahay.

D.T.H.

A. R. Arulpragasam, I. H. B. Ghosh, C. C. Ling, J. S. McMillan, and T. A. Malone.

Among awards of fellowships and scholarships the following are announced:—John Rankin fellowships in anatomy: senior, Dr. A. G. Leigh; and junior, Dr. R. A. Hughes. Robert Gee fellowship in human anatomy: Dr. A. J. Helfet. Holt fellowships: pathology, Dr. C. S. Anderson; and physiology, Dr. J. G. Hailwood. Thelwall Thomas fellowship in surgical pathology: Dr. A. S. Kerr. John W. Garrett international fellowship in bacteriology: Dr. E. R. Jones. Ethel Boyce fellowship in gynæcology: Dr. J. Polonsky. Samuels memorial scholarships: medicine, Dr. J. Libman; surgery, Mr. M. Silverstone; obstetrics and gynæcology, Dr. J. Polonsky.

University of Liverpool

Mr. Harold L. Cohen has given £100,000 to the university for the erection of a new library. Mr. Cohen's father, the late Mr. Louis Cohen, founded and endowed a chair of dental surgery in 1920.

University of Manchester

The following appointments have been made:—Dr. J. W. Bride, lecturer in clinical obstetrics and gynæcology; Dr. F. R. Ferguson, lecturer in neurology; and Dr. John Gifford, lecturer in mental diseases.

University of Sheffield

Dr. F. E. E. Schneider, medical superintendent of Rampton State Institution, has been appointed assistant lecturer in mental diseases and Dr. R. T. Cooke junior assistant bacteriologist in the university.

At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR M.B., CH.B. (PART II.).

Kathleen M. Adamson and M. B. Brody (with second-class honours); J. K. A. Beverley, Thomas Lodge, G. F. E. Ramsden, H. R. Vickers, and W. D. Wallace.

University of Dublin

At recent examinations in the School of Physic, Trinity College, the following candidates were successful:—

M.D.

J. W. Craig, H. B. F. Dixon, Anna M. E. M'Cabe, Harold Renton, and W. A. Robinson.

M.CH.

D. S. P. Wilson.

M.A.O.

R. H. J. M. Corbet.

FINAL EXAMINATION FOR M.B., B.CH., AND B.A.O.

Therapeutics and Pathology.—*D. T. Bardon, *Cecil Mushatt, Monty Toohey, Peter Delap, Isabelle M. V. Elliott, H. A. Daniels, Catherine T. M. Franklin, F. MacD. Byrn, G. B. Jackson, R. C. O'Grady, J. R. Sides, E. T. M'Cartney, Eileen D. Maunsell, A. J. Reeves, J. C. Gaffney, S. B. Sachs, C. W. Greene, G. H. B. Roberts, and E. R. N. Cooke.

Medicine.—D. S. Quill, Marie J. S. O'Toole, Eveleen M. H. Scott, F. M. Hanna, E. B. M'Entee, P. A. M'Nally, A. C. Pilkington, I. A. Walsh, C. M. T. Adamson, H. D. M'Gorry, J. F. Q. Conolly, A. F. J. Delany, W. G. B. Halliden, J. F. Harbinson, Nathan Weinstein, F. P. E. Smith, D. J. O'Shaughnessy, R. C. Tyner, R. F. Lurring, T. A. Cunningham, H. L. Connor, B. E. W. Aldwell, M. H. Cosbie, and A. D. Egan.

Surgery.—*F. M. Hanna, Nathan Weinstein, Eveleen M. H. Scott, E. E. O'Malley, P. B. Hafner, M. H. Cosbie, H. D. M'Gorry, H. F. T. Deane, R. C. Tyner, R. F. Lurring, W. G. B. Halliden, Kevin O'Toole, E. B. M'Entee, P. A. M'Nally, H. L. Connor, C. J. Vaughan, and F. P. E. Smith.

Midwifery.—*H. D. O'Brien, A. R. S. Jessop, J. J. Talbot, Leslie Fridlhon, A. E. Fannin, Eva E. Moore, H. A. Wells, and Philip Citron.

D.P.H.

Part II.—A. J. O'Connor, Anna M. E. M'Cabe, R. A. J. Holmes-levers, and I. G. M'Intyre.

* Passed on high marks.

Department of Scientific and Industrial Research

The Lord President of the Council has appointed Mr. E. Barnard, D.S.O., to be director of food investigation in this department, and Mr. F. Kidd, D.Sc., to be superintendent of the Low Temperature Research Station, Cambridge. Both posts were held by the late Sir William Hardy.

London (Royal Free Hospital) School of Medicine for Women

The prize-giving of this school was held in the Albert Levy Hall of the hospital on July 11th. Miss Elizabeth Bolton, the dean, presided, and in her review of the year's work mentioned the election of Dr. Helen Mackay, a former student, to the fellowship of the Royal College of Physicians of London. Prof. L. N. G. Filon, F.R.S., vice-chancellor of the University of London, presented the prizes and gave an address to the students. He said that without going into the question of women's education and co-education, they could all agree that the solution provided by the London School of Medicine for Women—namely, that they should develop their medical education in their own way—had been most conspicuously successful. They were on the threshold of life in a great and noble profession, and whether they regarded it as a business, a science, or a mission they would have the opportunity of striving to follow high examples in noble and self-sacrificing achievement. A vote of thanks was proposed by Lord Riddell and seconded by Sir Alan Garrett Anderson.

St. Mary's Hospital

The annual dinner of past and present students of this hospital will be held in the new medical school library on Saturday, Sept. 29th, with Dr. P. Montague Smith in the chair. The hon. secretary is Dr. A. Hope Gosse, 119, Harley-street, W.1.

St. Thomas's Hospital

The post-graduate course for old students of this hospital will be held from Monday, Sept. 24th, to Friday, the 28th. On this last date Dr. W. L. Wainwright will preside at the old students' dinner at the Dorchester Hotel.

University of Birmingham

Post-graduate lectures for former students of the university will be given on Oct. 4th and 5th. On the 4th, at 5 P.M., Dr. Francis Brett Young will distribute the prizes and give an address; and the dinner for past and present students will be held in the evening at 8.15. Further particulars may be had from the dean's office, the University, Edmund-street, Birmingham.

An Award to Sir Gowland Hopkins

On July 12th the Duke of Connaught, president of the Royal Society of Arts, presented to Sir Gowland Hopkins, P.R.S., the society's Albert medal for 1934 in recognition of his researches in biochemistry and the constituents of food. In making the presentation His Royal Highness said that Sir Gowland's discoveries not only had enriched biochemistry but had done much to make it a distinctive subject for study. "Of no less consequence to the general advance of science," he added, "has been your personal willingness at no small sacrifice of comfort and leisure to give help at all times and in every way to scientific workers and associations with scientific aims."

Fellowship of Medicine and Post-Graduate Medical Association

Dr. Clark-Kennedy will give a lecture-demonstration, on rheumatism, at the house of the Medical Society of London, Chandos-street, Cavendish-square, on Tuesday, July 24th, at 2.30 P.M. On the following Tuesday he will deal with sciatic pain. These lecture-demonstrations will be continued throughout August, except on August 7th. A short course of demonstrations on the treatment of recent and old fractures will take place at St. George-in-the-East Hospital from August 13th to 17th, at 2.30 P.M. daily. On Saturday, August 11th, Dr. H. V. Morlock will give a demonstration on chest cases at the National Temperance Hospital, Hampstead-road, N.W., at 3 P.M. All courses and demonstrations arranged by the Fellowship are open only to members. Full particulars of post-graduate work may be obtained from the secretary of the Fellowship, 1, Wimpole-street, London, W. 1.

Manchester Northern Hospital

Lord Derby recently opened the new Manchester Northern Hospital at Cheetham. A further sum of £24,000 is needed to cover the cost.

Training of Nurses

The Departmental Committee recently appointed by the Secretary of State for Scotland to inquire into the training and registration of nurses has now held its first meeting, and has announced that in view of the wide terms of the reference it will be necessary for the committee to review the whole problem of nursing, training, and registration. Its aim will be to evolve, if possible, a more logical system than the present one, which although an improvement on the position prior to the passing of the Nurses Registration Act in 1919 is still held to achieve little in the way of mobility and interchangeability for nurses who desire to attain proficiency in all branches of their profession. The committee will not meet again until after the holiday period—probably some time in October—but in the meantime it is open to receive memoranda on the subject of the inquiry from persons and bodies interested. All communications should be addressed to the secretary of the committee, Mr. W. T. Mercer, Department of Health for Scotland, 121A, Princes-street, Edinburgh.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, July 23rd to SATURDAY, July 28th.—ALL SAINTS HOSPITAL, Austral-street, West-square, S.E. Afternoon and evening course in Urology.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, Tues., at 2.30 P.M., lecture-demonstration (illustrated by cases) on Rheumatism, by Dr. A. E. Clark-Kennedy.—PANEL OF TEACHERS: Individual clinics in various branches of medicine and surgery available daily.—Courses, demonstrations, &c., are open only to Members and Associates of the Fellowship of Medicine.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.

THURSDAY, July 26th.—3 P.M., Dr. Anthony Feiling will demonstrate.

Appointments

LANGWILL, J., M.D. Edin., and MAXWELL, J., M.D. Lond., have been appointed Medical Referees under the Workmen's Compensation Act for the Kirkcaldy Sheriff Court District.

TODD, A. W. P., M.B. Dub., Medical Officer of Health for Wimborne Urban District, Dorset.

Hospital for Sick Children, Great Ormond-street.—The following appointments are announced:—

BRAIN, R. T., M.D., M.R.C.P. Lond., Physician in charge of the Skin Department.

CROOKS, JAMES, M.B. Edin., F.R.C.S. Eng., Aural Surgeon.

London County Council Medical Staff.—The following appointments, promotions, and transfers are announced. A.M.O.=Assistant Medical Officer.

WHITE, J. D., M.B. Edin., D.M.R. & E. Camb., Director of the radiological department of Hammersmith Hospital, and Consulting Radiologist to the Council's hospitals.

RAFFLE, A. B., M.C., LL.B. Lond., M.D., B.Hy. Durh., Divisional Medical Officer (Temp.).

HOGARTH, M. C., M.B. Aberd., Divisional Medical Officer.

SIMPSON, R. H., M.R.C.P., M.D. Lond., D.P.H. Oxon., Divisional Medical Officer (Temp.).

FRANCKLYN, A. B., M.R.C.S. Eng., D.P.H. Lond., A.M.O.

TIMON, E. M., M.B., N.U. Irel., A.M.O.

Vacancies

For further information refer to the advertisement columns.

Accrington, Victoria Hospital.—H.S. £150.

Bangor, Caernarvonshire and Anglesey Infirmary.—Jun. H.S. At rate of £100.

Barnsley, Beckett Hospital and Dispensary.—H.P. £200.

Bath and Wessex Children's Orthopædic Hospital, Combe Park.—Res. Asst. Surgeon. £350.

Birmingham, Monyhull Colony Certified Institution.—Jun. Asst. M.O. £350.

Birmingham University.—Reader in Industrial Hygiene, &c. £800.

Bolton Royal Infirmary.—Res. Surg. O. £250. Also Asst. Res. Surg. O. £200.

Bradford City.—Asst. School M.O. £500.

Bradford Royal Hospital.—H.P. and Two H.S.'s. Each at rate of £135.

Brentwood, Highwood Hospital for Children.—H.P. At rate of £80.

Carshalton, Queen Mary's Hospital for Children.—Asst. M.O. £350.

Central London Ophthalmic Hospital, Judd-street, W.C.—Chemical Pathologist. £105.

Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.

Colindale Hospital, Hendon, N.W.—Asst. M.O. £350.

Connaught Hospital, Walthamstow, E.—H.P. At rate of £100.

Derby, Derbyshire Royal Infirmary.—H.S. for General Surgery and Gynæcology. £150.

Edmonton, North Middlesex County Hospital.—Res. Asst. M.O. £400.

Evelina Hospital for Sick Children, Southwark, S.E.—H.S. At rate of £120.

Exeter, Royal Devon and Exeter Hospital.—Hon. Asst. Surgeon.

Gloucester, Gloucestershire Royal Infirmary, &c.—Hon. Ear, Nose, and Throat Surgeon.

Golden-square Throat, Nose, and Ear Hospital.—Registrars and Clin. Assts.

Grimsby County Borough.—M.O.H. £1000.

Hastings, Royal East Sussex Hospital.—Jun. H.S. At rate of £150.

Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.P. At rate of £100.

Huddersfield Royal Infirmary.—Cas. O. and H.P. £200 and £150 respectively.

King Edward Memorial Hospital, Ealing.—Jun. Res. M.O. At rate of £150.

Lincoln County Hospital.—Jun. H.S. At rate of £150.

Liverpool, David Lewis Northern Hospital.—Cas. O. At rate of £120. Four H.S.'s, Two H.P.'s. Each at rate of £80. Also H.S. to Gynæcological and Ear, Nose, and Throat. At rate of £80.

Liverpool, Royal Southern Hospital.—Two H.P.'s, Three H.S.'s, M.O. to Special Depts., and Res. Anæsthetist. Each at rate of £60. Also Res. Cas. O. At rate of £100.

Llanelly and District Hospital.—H.S. £150.

London University.—University Chair of Medicine. £2000. Also University Chair of Pathology. £1200.

Maidstone, West Kent General Hospital.—H.P. and H.S. Each £150.

Manchester, Ancoats Hospital.—H.P., and H.S. Each at rate of £100. Surg. Reg. and Orthopædic Reg. Each £50. Also Hon. Gynæcologist.

Manchester, Christie Hospital and Holt Radium Institute.—Radiological Asst. M.O. £450.

Manchester Royal Infirmary.—Res. Cas. O. At rate of £150.

Metropolitan Hospital, Kingsland-road, E.—Cas. O. At rate of £100.

Miller General Hospital, Greenwich-road, S.E.—Out-patient Officer. At rate of £150.

Montreal, McGill University.—Chair of Anatomy. $7000.

Near Pontefract, Ackworth School.—Part-time M.O.

Newcastle General Hospital.—Two H.S.'s and H.P. Each at rate of £150.

Newcastle-upon-Tyne, Hospital for Sick Children.—Res. Surg. O. £250.

Norwich, Jenny Lind Hospital for Children.—Jun. Res. M.O. £100.

Peterborough City, Maternity and Child Welfare Service.—Clin. M.O.

Preston, Sharoe Green Hospital.—Jun. Asst. Res. M.O. At rate of £100.

Queen's Hospital for Children, Hackney-road, E.—H.S. and Cas. O. Each at rate of £100.

Rainhill, County Mental Hospital.—Locum Tenens. 7 gns. per week.

Reading, Battle Hospital.—Asst. Res. M.O. £300.

Royal Eye Hospital, St. George's-circus, Southwark, S.E.—Hon. Asst. Surgeon.

Royal Naval Medical Service.—Ten M.O.'s.

Salisbury General Infirmary.—H.P. At rate of £125.

Sheffield Children's Hospital.—H.S. and H.P. Each at rate of £100. Also Res. M.O. £175.

Sheffield, Royal Hospital.—H.S. to Ear, Nose, and Throat Dept. At rate of £80.

Shrewsbury, Royal Salop Infirmary.—Cas. O. and Res. Anæsthetist. At rate of £160.

Southampton Children's Hospital and Dispensary for Women.—Res. M.O. At rate of £150.

Stockport Infirmary.—Res. Surg. O. £250.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Asst. H.P. £125.

Sutton and Cheam Hospital.—Hon. Radiologist.

Swansea General and Eye Hospital.—H.P. and H.S. Each at rate of £150.

Walsall General Hospital.—Hon. Physician.

Warrington County Mental Hospital, Winwick.—Deputy Med. Supt. £750.

Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.

West Bromwich and District General Hospital.—Radiologist. £150.

Wimbledon Hospital, Thurston-road, S.W.—Res. M.O. £105.

Wolverhampton Royal Hospital.—H.S. to Orthopædic and Fracture Dept. At rate of £100.

Births, Marriages, and Deaths

BIRTHS

SMELLIE.—On July 9th, at Sherwood, Woking, the wife of W. B. Smellie, F.R.C.S. Edin., of a daughter.

MARRIAGES

HUMPHREYS—WHITE.—On June 21st, at St. Martin-in-the Fields, Dr. Gordon Noel Humphreys to Marion, only daughter of the late J. Bradshaw White, M.D., M.Ch., and of Mrs. White, of "Bramshott," The Avenue, Claygate.

DEATHS

ANSON.—On July 15th, at Sudbury, Lower Hutt, N.Z., George Edward Anson, M.A., M.D. Camb.

DITTMAR.—On July 16th, at Tydeham Oaks, Newbury, Frederick Dittmar, M.D., F.R.C.P.E.

FLEMING.—On July 12th, suddenly, at his residence, Trafalgar Villas, Devonport, Robert John Fleming, M.B., B.Ch., D.P.H.

HEATH.—On July 13th, at York-terrace, N.W., Charles Joseph Heath, F.R.C.S., late of Devonshire-place, W.

LYON.—On July 10th, suddenly, at Dundee, Reginald Lyon, M.B., Ch.B., aged 44.

PENNY.—On July 7th, during the voyage home, Lieut.-Colonel Jeremiah Penny, I.M.S. (retired), of Kokine, near Rangoon.

STEEL.—On July 14th, at London, James William Steel, M.B., Ch.B. Edin., of Milton-road, Bournemouth.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

THE EXAMINATION OF PERSONS SUSPECTED OF BEING DRUNK

BY G. M. TANNER, M.B.

ANY medical man may find himself confronted with the unpleasant and difficult task of visiting a police station, and examining a person charged with "driving a mechanically-propelled vehicle while under the influence of alcohol." The examination may be requested on behalf of the person so charged, or on behalf of the police; in either case he must be prepared to form an opinion one way or the other, and he will probably be called upon to uphold this opinion in Court in the face of cross-examination, and sometimes in the face of an opposite medical opinion. Judging by accounts which appear from time to time in the press, there is a regrettably vague idea in the minds of many medical men as to the sort of tests which should be applied. Reports appear of tests which call for a degree of acrobatics or manual dexterity which is certainly beyond the scope of many a perfectly sober person. These tests are useless to the examiner, and grossly unfair to the person examined. The object of the examiner should not be to find out what intricate manœuvres the subject *cannot* perform, but to find out with what degree of accuracy he *can* perform certain ordinary, everyday actions with which he is familiar. This is the only fair way of testing him. The tests should therefore be quite simple ones, easily performed by any sober person of whatever education or intelligence, but at the same time tests most likely to be influenced by alcohol. To these tests must be added others which are unlikely to be influenced by alcohol one way or the other, but which will show whether or not the nervous system is free from any other disorder which is likely to influence the former tests.

A Routine Procedure

If a medical man is examining a person for a life insurance, he proceeds according to a set routine, and he records his findings on a set form. In this way he can be certain that no important test or examination will be omitted, and that the examination will be carried out in an orderly manner, and as expeditiously as possible. The object of this paper is to suggest that a similar procedure should be used in carrying out the examination of persons charged under the Road Traffic Act with being in charge of a mechanically-propelled vehicle while under the influence of intoxicants. In this way the examiner should be enabled to perform such an examination quickly and efficiently, without wasting time on haphazard investigations, and without the fear that he may omit some important point upon which he may be questioned later in the witness box. Very few medical men perform these examinations sufficiently often to keep a set routine at their finger-tips. The suggestion is, therefore, that a copy of a simple form should be kept in the wallet or bag, and that this form should be completed at the time of the examination. In this way no essential will be overlooked, and an exact record will be kept.

This suggestion is not an original one. A form similar to that suggested has been officially in use in Denmark since 1925. It is quoted in the Report of the Committee on Tests for Drunkenness, published in the *British Medical Journal* (Supplement), Feb. 19th, 1927, and this committee suggests "that with a view to uniformity in the method of testing for 'drunkenness' some such form of certificate as that drawn up by the Danish Medico-Legal Society might well be adopted for general use in this country." I am not aware that such a form has been produced; I therefore put forward the following form as one which, for want of a better, I drew up some time ago for my own use, and which I have since used and found most helpful. Both the form itself and the comments which follow are open to correction by those with more experience of these cases than myself, and any criticisms will be most welcome. The production of the form itself is a very simple matter; it is only the work of a few moments to type a few copies with carbons; one copy is then kept in one's bag for use when required, and the reserve supply in one's desk.

SUGGESTED FORM:

Examination of ..... *Date* .....
Place of Examination ..... *Time* .....

1. *History:*
   - P.H. of Head Injury? .....
   - P.H. of Disease of C.N.S.? .....
2. *General:*
   - Appearance? .....
   - Skin? .....
   - Conjunctivæ? .....
   - Tongue? .....
   - Breath? .....
   - Temperature? .....
   - Pulse? .....
   - Respiration? .....
3. *C.N.S.:*
   - Pupils? .....
   - Hands? .....
   - Knee Jerks? .....
   - Finger-nose Test? .....
   - Romberg? .....
   - "Lock Test" .....
4. *Cerebration:*
   - Memory? .....
   - Reading? .....
5. *Any other Observations:*

The procedure at the examination is simple. The examinee is first asked if he has any objection to the performance of the examination. His consent being obtained, he is next asked whether he has at any time suffered from any head injury, or any affection of the nervous system. This question is most important, and is sometimes overlooked. If there is a previous history of either of these, allowance must be made for its possible effect on the present condition. Also, throughout the whole examination, it is important to make due allowance for the fact that the person examined is in unfamiliar and even hostile surroundings; and his degree of intelligence and education must also be assessed.

His general appearance is noted while the above questions are being asked. His tongue is then inspected, and simultaneously any odour in his breath is observed. The rate and character of his pulse and respiration are observed and recorded, and the condition of his skin noted. The temperature should be taken, to exclude the onset of acute illness. (A case was quoted in the press a short while ago in which a man drove a car in an erratic manner as a result of the high temperature accompanying the onset of influenza. The possibility of a "snag" of this kind must be kept in mind.) The eyes are next examined, the pupil reactions and the condition of the conjunctivæ being observed. The knee jerks are tested, and the hands are examined for tremors. This completes the passive part of the examination.

The examinee is then asked to perform four simple tests. The first and second are the finger-to-nose test for incoördination, and Romberg's test. The third is a composite test which I have called on the form the Lock test. The person examined is instructed to take a key from the doctor, walk over to a door on the far side of the room, lock and unlock the door, turn, and bring the key back to the doctor. The examiner observes whether there is any intention tremor when the examinee stretches out his hand to take the key, whether his gait is normal, whether he "navigates" a reasonably straight course across the room, whether he fumbles with the lock (remembering, if he does fumble, that he may be short-sighted), whether he is unsteady in turning to walk back, and whether his return course is also reasonably straight. This is a much fairer test than the old "chalk-line" or "heel-to-toe" tests, because the examinee is simply given the opportunity of walking from one point to another in a natural manner.

The fourth performance is reading. Any book or newspaper is taken—there is certain to be one handy—and the examinee is told to read any paragraph he likes. The examiner follows the matter read by looking over the reader's shoulder, and observes any slurring or stumbling, making allowance for any jerkiness, halting or mispronunciation which may be due to lack of education. This is a much fairer test for dysarthria than the old "test-sentences."

Memory is best tested by asking the person examined such simple questions as the following: What did he have

for breakfast on that day? At what time did he have breakfast? The same queries regarding lunch, tea, etc. At what time was he apprehended? How long has he been waiting at the Police Station? And so on. From my own limited experience of examining these cases, I should say that the memory of very recent things is more often confused under the influence of alcohol than the memory of more distant things, and that *confusion of the sense of time* is a very significant point. This impression is confirmed in the Report already referred to.

The estimation of the amount of alcohol present in the urine, blood and cerebro-spinal fluid are accessory measures which have been employed, but for practical purposes, at any rate in connection with these examinations, I think that they may be omitted. If the clinical findings are quite definite one way or the other, they need no support from accessory investigations; if on the other hand they are so indefinite as to need this further support, then I think that the examinee should be given the benefit of the doubt without more ado.

I do not propose to discuss any further the interpretation of the results of the examination; that is not the object of this paper. I have merely endeavoured to suggest a scheme whereby these examinations may be made more simple and methodical to the doctor, and more fair to the person examined; and in the hope of eliminating these "freak" tests which appear from time to time, and which, although they may give rise to a certain amount of amusement in Court, do not enhance the reputation of our profession.

MORE ABOUT POISON GAS

IN a pamphlet with the suggestive title, "Don't Be Afraid of Poison Gas" (published at 1*s.* by Simpkin Marshall, Ltd., London), Mr. F. N. Pickett, a chemist, whose experience with gas was obtained in dispensing the dumps in France, has endeavoured, with success, to tell the civilian just what he wants to know about the various kinds of gas and the defence against them. Panic is the greatest danger, he says, and if we all stay at home with the windows shut nothing much can happen. Even if forced to leave the house all will be well if we have a gas mask, rubber boots, gloves, and rubber clothing, and chloride of lime. The provision of these articles, it appears, should not cost more than about £7 a head ("Apply, Chemical Warfare Defence League"). Mr. Pickett is of opinion "from the terms still in use" that "medical men know very little of poison gas." He states, however, that a valuable report was published in 1924 on the system of diagnosis and treatment of gas-poisoning in use during the breaking down operations on the dumps, and he hopes to have it reprinted so as to "make copies available to every doctor at a nominal charge." On the authority of this book, however, we are told that the safest preliminary treatment is to bleed the patient of 250 c.cm. of blood. It is not explained that this applies to the Green Cross (chlorine and phosgene) group only (see THE LANCET, April 21st, 1934, p. 856).

A ROAD-HOUSE SWIMMING POOL

SWIMMING baths, or pools as it seems now to be the fashion to call them, add greatly to the attraction of road houses and, indeed, of any places of summer resort. When, however, the water is either turbid or green on the one hand, or too highly chlorinated on the other, few care to use them.

The "Gay Adventure" between Esher and Hersham has a small pool pleasantly situated in a large garden on the bank of the River Mole. It was, before the present season, sterilised, after the usual filtration and coagulation, by chlorination, and difficulty was found in keeping down confervoid growths without a somewhat excessive use of chlorine. This year for two months the Electro-Katadyn process has been used, and so far green growths have given no trouble. The katadyn process is of special interest, depending, as it does, on the sterilising action of the very small proportion of silver which can be introduced into the water as, it may be assumed, free silver ions. In the variant of the process used at the Gay Adventure a small fraction of the clear filtered water, before it returns to the bath from the filtration plant, is passed between two silver plates acting respectively as kathode and anode, the water being the electrolyte through which a small current passes. Traces of silver leave the surface of the anode and enter the water. At intervals (determined, apparently, by an electric clock) the current direction is reversed so that the plates alter their polarity and waste equally.

The bath, when visited by our representative, was found to be filled with clear, colourless water, only visibly contaminated by a few fallen leaves. Since the nature of the land necessitated building-up around the bath, the only way in which soil and grit could enter the water was via the shoes of bathers passing to the dressing-boxes from the sides of the bath. This, although usual, is not an ideal layout. The cascade from which the water re-enters the bath was very well arranged; it discharged on to a gentle slope of concrete, whence, by a series of steps extending right across the shallow end, it (and the more timid bathers) entered the bath. Where, as in this case, the bath is used by school-children, the opportunity of getting out of the water anywhere along the end promotes a feeling of security. The deepest part of the bath, in accordance with modern practice, was not at the deep end but in the region where a diver from this end would near the bottom.

Samples of the water, which is heated to 75° F., were taken from the cascade, the surface at the deepest part, and the place where used water enters the purification plant. These when examined bacteriologically were found, although not sterile, to contain few organisms, and were described by the bacteriologist as satisfactory.

THE PROBLEMS OF HUMAN REPRODUCTION

THOUGH generally classifiable with the many books that have, in recent years, been written with a view to instructing the layman in the mysteries of procreation, a little volume by Mr. A. F. Guttmacher[1] has much more to recommend it than most of these. The author, the dust cover informs us, has done much laboratory work, and has written several scientific papers on subjects connected with the material of this book, especially on the subject of twins. He himself is an identical twin. The book does not pretend to be an introduction to, or a manual of, what is now called sexology, nor is it dedicated to those about to get married. It consists rather of a series of essays written around some of the central problems of human reproduction. The volume consists of twenty-one chapters classified under the following six headings: How life begins; Sexual Rhythms; Male and Female; Sex Determination; Sterility and Fertility; Twins. The author's method in dealing with these general topics is to begin with what he calls the "lore" of the subject, that is to say, the beliefs, superstitious and philosophical, which have been held in historical times. The evolution is described of a group of human ideas, the story in each case being carried up to the present day. This method of exposition makes interesting reading, for Dr. Guttmacher is equipped with an intimate knowledge not only of the history of medicine and physiology, but also of social anthropology and of the most recent scientific literature. Each of the six sections of the book reads like a story, vividly and pleasantly told, which ends with a clear and erudite summary of scientific knowledge up to 1933. Though written for the layman the book contains much that will be of interest to medical readers. The book would also make pleasant and instructive holiday reading for students.

[1] Life in the Making. By A. F. Guttmacher, Associate in Obstetrics, Johns Hopkins University. London: Jarrolds. 1934. Pp. 287. 10*s.* 6*d.*